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THE

MISCELLANEOUS DOCUMENTS

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FOR THE

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1887-'88.

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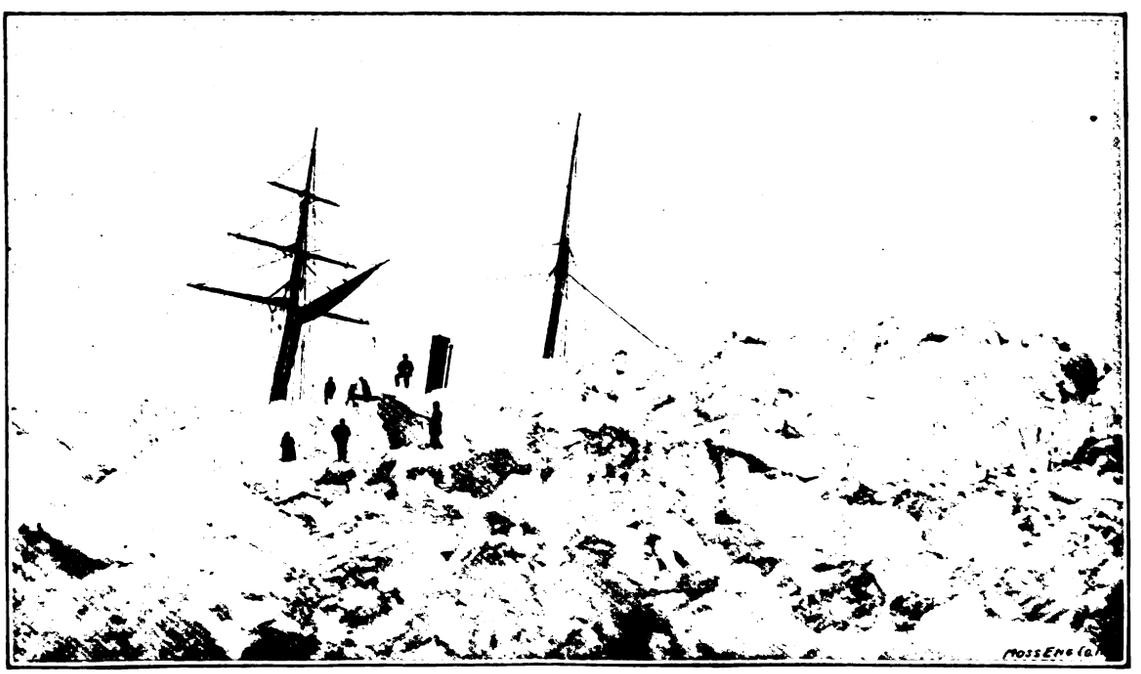
1890.

U. S. REVENUE CUTTER CORWIN ENTERING A LEAD.



FAST IN THE ICE.

50TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { MIS. DOC. No. 602.

REPORT

OF THE

CRUISE OF THE REVENUE MARINE STEAMER

CORWIN

IN THE

ARCTIC OCEAN

IN

THE YEAR 1884.

BY

CAPT. M. A. HEALY, U. S. R. M.,
COMMANDER.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889

LETTER

FROM

THE SECRETARY OF THE TREASURY,

IN RESPONSE TO A RESOLUTION BY THE HOUSE,

TRANSMITTING,

With accompanying documents, the report of Capt. M. A. Healy, U. S. Revenue Marine, upon the cruise of the Revenue Marine steamer Corwin in the Arctic Ocean in the year 1884.

TREASURY DEPARTMENT, *February* 28, 1885.

SIR: In response to the resolution of the House of Representatives of the 17th instant, I have the honor to transmit herewith a copy of the report of Capt. M. A. Healy, U. S. Revenue Marine, upon the cruise of the Revenue Marine steamer *Corwin* in the Arctic Ocean, made in the year 1884, and its accompanying documents and illustrations.

This report contains the results of some original explorations and observations, made by the officers of the *Corwin* while prosecuting their regular duties in Alaska, and is deemed of considerable public importance. The explorations of the banks of the Kowak River are the first ever recorded, although the river has been known through information furnished by the natives for thirty years.

The following is the list of inclosures which constitute the report and its accompaniments:

(1) General report of operations of vessel for the protection of the seal fisheries and sea-otter hunting-grounds, including report of Lieutenant Lutz.
(2) Examination and description of Bogoslov Volcano, with illustrations.
(3) Report of Lieutenant Cantwell of the survey of the Kowak River, accompanying his journal, with illustrations.
(4) Notes on the Kowak River and Northern Alaska by Engineer McLenegan.
(5) Notes on birds, by Engineer McLenegan, with illustrations.
(6) Memoranda regarding the flora and fauna of the Kowak River.
(7) Notes on fishes.
(8) Notes on plants.
(9) Notes on marine invertebrates.
(10) Notes on rocks.
Illustrations.

I have respectfully to request that in printing the above-mentioned report provision be made by Congress to furnish to the Treasury Department eighteen hundred (1,800) copies.

Very respectfully,

H. MCCULLOCH,
Secretary.

Hon. J. G. CARLISLE,
Speaker House of Representatives,
Washington, D. C.

CAPT. M. A. HEALY'S LETTER OF TRANSMITTAL.

U. S. REVENUE MARINE,
REVENUE STEAMER CORWIN,
Martinez Cal., November 10, 1884.

SIR: I have the honor to submit herewith a report covering the operations of this vessel during her recent cruise in the Arctic, together with a report of Lieut. J. W. Howison, who was located thirty days at Point Hope, and of Lieut. J. C. Cantwell and Assistant Engineer S. B. McLenegan, regarding their exploration of the Kowak River.

I would respectfully call attention to the fact that the head of the river was not reached either by our party or the naval expedition, and the most interesting portion of the river remains unexplored. As far as I can learn, the naval expedition ascended about four hundred miles, and that from the *Corwin* three hundred and seventy-nine—little or no difference. Lieutenant Cantwell had reached his highest point and was returning when he met the expedition under Lieutenant Stoney.

We are the pioneers of the river, and I believe the report of Lieutenant Cantwell will be read with interest.

The specimens of birds and minerals collected were forwarded upon our arrival.

The floral specimens are forwarded by to-day's mail for classification. Those collected up the river are separately marked from those obtained along the coast.

I also forward the report of Lieutenant Lutz of his operations at the seal islands, together with a chart showing soundings, and rocks and shoals surveyed by him. I fully indorse his recommendation that the officer detailed for duty at the seal islands take up his residence hereafter on St. Paul Island instead of Otter Island. At St. Paul Island plenty of men and boats can be obtained and much more effective work be accomplished than could possibly be done by an officer on Otter Island with but two men. Otter Island may be visited as often as necessary.

The officers of the schooner *Adele*, seized by Mr. Lutz, all pleaded guilty on the charge for which they were indicted and have been sentenced to four months' imprisonment. The case of the schooner is still undecided. I believe that the conviction of the officers was due in a great measure to the attention and perseverance Mr. Lutz has given to the case.

Since my return I have learned through men who have been seamen on the seal-marauding vessels that most of the seal taken this year were killed on St. George Island and near the village and directly under the nose of the special agent. This could not have been done if anything like a decent lookout had been kept.

I would recommend that an officer of this service be stationed on that island next year, and I think these seal-marauding expeditions will be broken up.

The inclosed reports, together with partial reports transmitted heretofore, cover the entire operations of this vessel on her late cruise, and I believe the whole to be as complete as could be expected of a seaman untrained in the work of collecting scientific data.

I have to express my thanks to Prof. George Davidson, of the U. S. Coast Survey, for important assistance in the work of making the chart of the Kowak River, etc., and to the various gentlemen connected with the U. S. National Museum whose statements regarding specimens of natural history collected by the *Corwin* form a part of this report.

I am, very respectfully, your obedient servant,

M. A. HEALY,
Captain, U. S. Revenue Marine.

The SECRETARY OF THE TREASURY,
Washington, D. C.

REPORT

OF THE

CRUISE OF THE STEAMER CORWIN.

U. S. REVENUE MARINE STEAMER CORWIN,
San Francisco, November 7, 1884.

SIR: I have the honor to submit the following report of the cruise of U. S. revenue steamer *Corwin*, under my command, in the waters of Alaska, Behring Sea, and the Arctic Ocean, during the months of May, June, July, August, September, and October, 1884, in compliance with orders of the Department under date of April 18, 1884.

Having completed arrangements and received on board the necessary supplies, at 1. p. m. of May 3 we weighed anchor and stood out of San Francisco Harbor. At 8.40 p. m. of the same day departure was taken from Point Reyes and the vessel's head was turned to the northward and westward.

For the minor details of the cruise to the Aleutian Islands, I would respectfully refer you to the copy of the ship's log heretofore forwarded, nothing of special importance having occurred requiring further notice.

At 11.15 p. m. of May 15 we anchored in Ounalaska Harbor. On the following morning the vessel was placed alongside the dock for the purpose of taking on board coal and water. Our surplus stove-coal was put on shore that its room might be utilized.

Rev. Mr. Hartmann and Mr. Wieland, the Moravian missionaries who had been granted passage on the vessel by sanction of the Department, left the vessel at this place.

In preparation for the severe work about to be performed fires were here hauled, boiler blown down, and engine and boiler overhauled and cleaned. On the 19th fifty-four tons of the coal belonging to the service and stored at this place was taken on board.

At 10. a. m. of the 20th the town was visited by a very perceptible shock of earthquake, which was felt on board ship.

At 8 p. m. of the 20th, having filled fresh-water tanks and boarded the vessels in the harbor, lines were cast off and we stood towards Bogoslov.

At 6 a. m. of the 21st the vessel was anchored near this island, and Lieutenants Hall, Doty, and Cantwell, together with Assistant Surgeon Yemans, were detailed to go on shore and gather such information as they could concerning this remarkable volcano. Lieutenant Hall made a flying survey of the island; Lieutenants Doty and Cantwell photographed several of the noteworthy features, and Lieutenant Cantwell and Dr. Yemans made various notes, which were embodied in the reports I had the honor to forward to the Department.

I trust that the facts thus secured, together with the geological specimens obtained, will be of importance to the scientific men of the country, as I am assured they will be of interest to the reading public. I regret that limited experience and time precluded the possibility of fuller details, there being many phenomena which I think well worthy the time and investigation of our best scientists.

On May 22 I returned to Ounalaska, and being in a safe place employed the time to May 29 in taking on board forty-six tons of coal in bags and doing much work about decks that had become absolutely necessary in order to prepare the vessel for an extended sea cruise to the northward.

May 22 the services of the *Corwin* were called into requisition by the bark *H. W. Almy*, Captain Smith, a vessel which had anchored in the outer harbor, and after two unsuccessful attempts to go to sea, had been obliged to anchor in a dangerous position and requested our aid in extrication.

May 29, having completed the most necessary repairs, we got under way and after touching at Bogoslov on the 30th, stood for the seal islands. At 9 a. m. of the 31st we anchored off St. George Island. From Mr. George Wadman, United States special agent, stationed at this island, I learned that the schooner *Alexander*, a vessel ostensibly engaged in sea-otter hunting, visited the island under pretext of filling water casks, but Mr. Wadman was quite convinced that the master contemplated a raid on the seal rookeries. Though no seal had been taken on the island by the schooner, three hundred skins were found on board. No other vessel open to the suspicion of being a marauder had been seen in that vicinity. At 10 a. m. we got under way and proceeded to Otter Island, where we landed twenty-five bags of coal for the use of the officer to be stationed there. At 7 p. m. we anchored off St. Paul.

On June 1 Lieut. J. E. Lutz was landed with a detail of two men to take up his residence on Otter Island during the sealing season. The usual instructions to the officer detailed for this duty were given him.

At 4 p. m. of the same day we got under way and resumed our northern course.

At 9 a. m. of June 2 floating ice was first sighted, and by 6 p. m. it had become so heavy as to prevent the vessel approaching nearer than ten or twelve miles to St. Mathew's Island, where I had intended visiting. From this time up to June 7, when we anchored near St. Michael's, the vessel was being worked through heavy drift and field ice, following up leads where they were presented, or tracking along the pack ice in search of favorable openings, sometimes under sail alone, or steam, or both, as weather and occasion demanded, the object in view being as early an arrival as possible at the Indian villages in order to prevent traffic in illicit goods.

While thus cruising among the ice several banded seal were shot, with the intention of procuring specimens for the Smithsonian Institution, but they sank as soon as they were killed.

At St. Michael's the ice was so heavy as to prevent our entering the harbor, and we were obliged to land on the outside of the island and cross it to the village. Here I took on board a native interpreter and a Mr. Miller, a practical miner, who desired to accompany the proposed boat expedition up the Kowak River. Mr. Miller was to receive no compensation other than his rations.

I would respectfully state that the sheathing and ice-breaker placed upon the vessel last spring stand the severe test to which they have been put admirably, and have enabled us to work through ice that otherwise would have been impassable.

Last year the Golowin Bay Mining Company, of San Francisco, sent a schooner, the *Alaska*, with twenty men on board, to Golowin Bay, a small arm of Norton Sound, for the purpose of working a silver mine up the Fish River, a tributary to the bay. No news had been heard from them up to the time of the departure of the *Corwin* on this cruise. Just previous to sailing I received a communication from the secretary of the company, requesting me to ascertain, if possible, their fate or condition. Having this important matter in view, at 3 p. m. of June 8 I left St. Michael's for Golowin Bay, arriving at that place at 2 a. m. of June 9. Lieutenant Hall was immediately dispatched to the mining camp for the purpose of obtaining all possible information. He found at the camp four men who had wintered there, and from them learned the following facts: The schooner *Alaska* left Golowin Bay for San Francisco October 21, 1883, with a cargo of seventy-five tons of galena ore. The following persons were on board:

Crew.—Master, William P. Gallagher; mate, Walter Hoepfner; second mate, W. Marston; seamen, Arthur Eaton, James Muir, George, Tom—surnames of last two not known.

Passengers.—John Lowrie, Andrew Doulson, Charles Thompson, Samuel Marston, Charles Babb, George Eastman, R. B. Hart, James Thompson, W. H. Cardinell.

Diligent search during our cruising revealed nothing concerning the schooner's fate. Subsequent inquiry among the whalemen, however, resulted in the information that a schooner was seen

YUKON RIVER NATIVES. COAST ESKIMOS.

FORT ST. MICHAELS.

INDIAN TRADING CAMP NEAR SAINT MICHAELS, ALASKA.

about October 28, 1883, by Captain Smith, of the *Bowhead*, and others, just previous to a heavy gale, between St. Lawrence and St. Matthew's Islands. This spring a schooner, bottom up, has been seen by several parties to the westward of the Aleutian Islands, and in all probability this wreck was the *Alaska*. I feel little hesitation in saying that she foundered in the gale referred to, or one subsequent, and that all hands perished.

Lieutenant Hall was also directed to make close inquiry regarding the relations existing between the miners and the Indians. A few questions elicited the information that two Indians had been killed during the winter by the whites for breaking, entering, and robbing the company's store-house. The miners claimed that the killing had been done in defense of life and property, and had been resorted to only as a last extremity and after peaceful means had failed. After hearing this plea in justification of the act, I sent Lieutenant Hall with our Indian interpreter among the natives to make a searching investigation as to the facts of the shooting, the character of the Indians killed, and the general treatment of the Indians by the whites. The natives unanimously agreed that the shooting was entirely justifiable; that the dead men were desperadoes and had been for years a terror to their own people, and that their treatment by the whites had been uniformly kind and humane. Under these circumstances I did not deem further action in the premises necessary, more especially as the men concerned in the killing could be found later on in San Francisco.

At the time of our visit the supply of provisions in the camp had become nearly exhausted, and I issued to them from the ship's stores sufficient to last them until the middle of July. I informed them that in case they desired to return home passage could probably be obtained on the steamer *St. Paul* from St. Michael's about July 15, or in case they should fail to make this arrangement that they could go down on the *Corwin* in the fall. I also agreed that in case they desired to remain at the mine over winter to convey to their camp such provisions as they might be able to purchase at St. Michael's. Subsequently (August 4) these provisions were transported and landed as agreed.

On September 4 I found five of these miners at St. Michael's. As there was then no other means of transportation, and not sufficient food at the station to warrant the agent keeping them over winter, I was obliged to grant them passage to San Francisco.

In connection with this work I desire to express the satisfaction I feel in being able to be of service to citizens who have interests in these Arctic seas, and at the freedom with which they ask for the assistance of this vessel in matters of private importance, public interest, and humanity; but, nevertheless, I can not censure in too severe terms the employment of persons here without sufficient stores and with inadequate means of retreat.

On June 9 I left Golowin Bay and proceeded to the westward under sail, and sail and steam, and had clear water until the evening of the 10th, when heavy drift-ice was encountered off King's Island. From King's Island we stood to the northward, working through ice until 10 a. m. of the 11th, when the vessel was made fast to an iceberg for the purpose of watering ship. At 7.20 p. m. lines were cast off and we steamed to the northward and eastward. At 8 a. m. of the 12th the ice by an erratic movement swung around to the southward of the vessel, completely inclosing us in the pack. There being no clear water vissible from the masthead I made no exertion during the day to extricate the vessel from her position, hoping that the ice would open and give us a lead to the southward into clear water. At 8 a. m., however, finding our position growing more serious, as the vessel was drifting to the northward in the pack at the rate of one and a half knots, I made a determined effort to work out under a full head of steam, but after three hours of hard work I was obliged to desist, as the vessel could not be moved in any direction. At midnight another attempt was made under steam and sail, and although for several hours the gain to the southward was hardly perceptible, we gradually entered weaker and more open ice, and at 8 a. m. of the 13th, to the satisfaction of all, and to my intense relief, clear water was reached. The thumping of the vessel against the heavy ice as she was being forced through it was something terrific. At times it seemed hardly possible that she could hold together under the pressure, and if it had not been for the sheathing and strengthening received last spring it is, in my opinion, extremely doubtful whether she would have ever emerged from her perilous situation.

After getting clear of the pack I proceeded to the westward under sail. At 2.15 p. m. the steam whaler *Orca* was spoken, and from her master I learned that but six vessels had entered the Arctic, the rest of the fleet being blocked by the ice to the southward of St. Lawrence Island. Such being the case, I deemed that the interests of the Government would be best served by remaining in the vicinity of the straits and boarding these vessels as they entered the jurisdiction of the United States. Two weeks later the fleet passed into the Arctic on the Siberian side, and therefore it was out of my power to intercept any liquor they might have had on board for trading purposes.

Meanwhile I visited East Cape, St. Lawrence Bay, Diomede Islands, Cape Prince of Wales, and Port Clarence, making frequent but unsuccessful attempts, as the ice receded, to enter Kotzebue Sound.

June 15, at Kruzenstern Island, one of the Diomedes, I learned that whisky had been sold to the natives by one of the whalemen, but the most searching inquiries failed to discover the name of the vessel or that of her master. At one time the Indians would say that the ship that sold them the liquor was a steamer, and almost in the same breath declare that it was a sailing vessel with one, two, three, and even six masts; that her master was a little man, a big man, and almost anything else they were asked. So contradictory were they in their statements that it was absolutely impossible to gather any reliable information as to the guilty vendor. An armed boat's crew, under the command of Lieutenant Hall, was sent to the village with instructions to search the huts and seize any liquors that might be found there. On landing he was surrounded by a crowd of half-drunken Indians, and was informed by one of their number where a five-gallon can of alcohol could be found. This he obtained and brought on board. With the single exception noted no liquor has been found on the Alaskan shore, and, judging from the conduct of the natives, none has been landed. The same can not be said, however, of the Russian side, as at nearly all the settlements visited on that shore natives were seen under the influence of liquor.

Until July 1, when a heavy gale broke up the ice and drove it to the northward, little could be done. The drifting ice required the vessel to be kept in motion, while the dense fog rendered unceasing vigilance imperative.

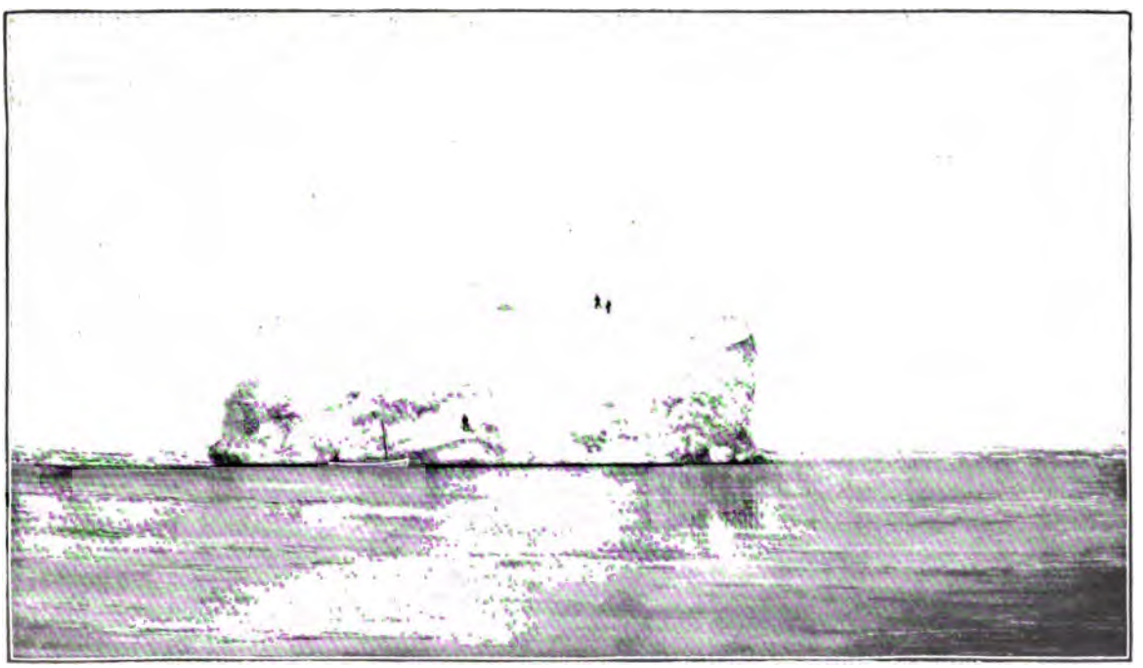
On the 7th of July I was unable to reach Hotham Inlet, and on the 8th sent a boat's crew in the steam-launch to explore the river located by a boat's crew from this vessel under Lieutenant Storey last year. The party consisted of Lieut. J. C. Cantwell, in charge; Assistant Engineer S. B. McLenegan, Quartermaster Horace Wilbur, Fireman J. Lewis, Mr. Miller, a miner previously mentioned, and our native interpreter. Lieutenant Cantwell was furnished with necessary orders, a copy of which is inclosed. Lieut. George H. Doty, who was to have charge of the expedition, unfortunately lacerated his hand so badly just before starting as to wholly unfit him for the work to be performed, and Mr. Cantwell being available, I placed him in charge.

Having dispatched the expedition and landed the necessary supplies for it, we got under way and stood to the westward. After several days' hard fighting with the ice we reached Point Hope on the 17th with the steam-whalers. But two sailing vessels had arrived, the rest having been detained by the ice and a dense fog which had prevailed during the previous three weeks. On the 18th the steamer *Beda* and bark *Thomas Pope* arrived with mail and supplies for the fleet. The *Beda* brought up a party of four men for the purpose of ascertaining if the coal seams near Cape Sabine could be worked with profit. I understand that an 18-foot seam has been found. The coal is of better quality than has hitherto been mined at this place, and arrangements will be made the coming winter for taking it out.

The *Beda* also had eight men on board, who are to establish at Cape Smythe, eight miles from Point Barrow, a whaling station similar to those on the coast of California. These people are to remain here all winter.

In this connection I desire to suggest to the Department the advisability of establishing a life-saving or relief station at Point Barrow for the benefit of the large and constantly increasing number of American vessels frequenting the Arctic during the whaling season, which are obliged to encounter the rigors and dangers of this polar climate. Such a station located at this point would be of the greatest value to these vessels, as ships are frequently wrecked by ice in this vicinity and the crews undergo great hardships and suffering while on shore waiting for rescuing

ESKIMO TRADING PARTY.



ICEBERG OFF POINT BARROW.

ships. In fact, a majority of the whale ships lost in the Arctic have been crushed in the ice near Point Barrow. Thirty-three vessels were lost in this vicinity in 1871, thirteen in 1876, one in 1882, and one in 1883.

The whaling captains with whom I have conversed on the subject earnestly request that I urge upon the Department in the strongest terms the utility and necessity of such an establishment, and promise in case of favorable action to leave each year a portion of their outfits to assist in forming a depot of supplies, providing only that the Government will furnish a responsible person to take charge of the same. I have been assured that any of the whale ships will transport to Point Barrow without charge such materials and supplies as may be necessary for the station. The buildings left by Lieutenant Ray might be utilized, and with some small and inexpensive repairs made suitable for the purposes of a relief station.

The fact that two volunteer crews, composed in part of men of Arctic experience, have come into this country to remain during the winter for commercial advantages should refute the generally conceived idea of unendurable hardships, and silence any opposition that may be made to this most humane suggestion on that score. I desire to impress upon the Department the importance such a post would soon acquire, not only with reference to its value as a place of refuge for wrecked seamen, but as a means of checking illicit trade and collecting meteorological data and scientific information. The person in charge and the keeper of the station, who would be *ex officio* inspector of the customs, would soon be able to put a stop to the sale of liquor in the vicinity of the station, an item of no small importance in itself. I understand that Captain Herenden and the crew that is now there might be willing to undertake the duty, in which case it would only be necessary to endow it with the proper powers and incorporate it into the Life-Saving Service.

In my estimation there is no more worthy object around which our Government can throw a protecting arm than the whalemen frequenting the Arctic and encountering its perils, nor can I conceive of a project that would reflect more credit on the Life-Saving Service, forming such an important feature of it.

Until July 23 time was employed in boarding and examining the vessels as they arrived. No contraband goods were found, notwithstanding our thorough search, except on board the bark *Northern Light*, Capt. James McKenney, where the searching officer found fifteen gallons of a vile spirituous compound and ten gallons of fair quality American whisky. McKenney claimed that all of it was intended for the use of his officers and crew, and not for trading purposes. Deeming the whisky sufficient for the purpose claimed, I sealed the other up. Had not the quantity been so small I should have seized the vessel and sent her to San Francisco.

The necessity of constantly moving to avoid the drifting ice had now so reduced the quantity of coal on board that I found it necessary to proceed to Port Clarence for fuel. About one-half of the fleet had been boarded and examined. The natives had considerable bone stored at Point Hope that they would trade only for whisky, and as whaling vessels were constantly passing and repassing this place I did not deem it advisable to leave it unguarded. I therefore directed Lieutenant Howison to take up his residence here with a detail of two men, and instructed him to use all possible diligence in preventing traffic in contraband articles.

I would respectfully state that some of the masters of the vessels boarded made no secret of having brought large quantities of liquor into the Arctic for trading purposes, but had thrown it overboard before reaching the United States boundary line on learning that a revenue-cutter was in these waters.

I received here from one of the whalers three men belonging to the schooner *Caleb Eaton*, wrecked at Indian Point, Siberia, but was able to find a place for one on the steamer *Beda*. The others, not desiring to ship on the whalers, I was obliged to retain on board.

On the 24th I proceeded to the southward, reaching Port Clarence July 30.

I found that the ship *Syren*, Captain Crocker, having on board five hundred tons of coal destined for the use of vessels in this service during Arctic cruises, had arrived and was engaged discharging the same.

This coal has since been landed above high-water mark, and, as per contract, I selected Point Spencer, at the entrance of the harbor, as the proper site of the coaling station, there being seven fathoms of water within half a ship's length of the beach, thus facilitating the landing and taking

of fuel. Without doubt this spot is the most favorable that can be chosen for the purpose intended. Spacious, with uniform soundings of from seven to nine fathoms, good holding bottom, easy of access, little frequented by heavy winds during the summer months, and affording excellent opportunities for watering ship, Port Clarence possesses all the requirements of a good harbor, while its proximity to the Arctic fulfills the main condition requisite in a base of supplies.

Viewing the matter in the same light that it appears to me, the Pacific Coast Steam Whaling Company, acting on the advice of its most experienced captains, has selected a site near to that of the Revenue Marine Service as a place of deposit for a cargo of coal for the use of its vessels.

August 1, Lieutenant Cook reported on board, having finished the duty to which he had been assigned, in connection with the establishment of the coaling station.

On the same day I broke the seals placed on liquors on board the *Northern Light*, the quantity left open having been used.

Having coaled ship and taken on board a supply of fresh water, we sailed August 2 for St. Michael's, where we arrived on the 3d, having stopped en route at King's Island. The natives at the latter place seem to be in a prosperous condition.

On the 4th we proceeded to Golowin Bay, conveying the stores for the mining company, to which reference has been made.

Here I was surprised to find the mainmast-head sprung. Upon lifting the main rigging and trestle-trees I found the mast-head completely gone under the trestle-trees by reason of dry-rot, and had precautions not been taken the mast-head would have fallen on deck when the trestle-trees were removed.

Cutting the mast-head down to good wood, the ship's carpenter formed a new one, which, although shorter than the old, answered the purpose for the balance of the cruise, as it admitted of the setting of a reefed mainsail. The rigging being in good condition and desiring to avoid spoiling the gang for a new mast, I had the dead-eyes slipped out of their splices and set the rigging up with wire straps. In this manner a serviceable mast has been saved for the cruise, and the rigging can be used on the new spar which it will be necessary to purchase.

Having completed these repairs, I proceeded to the westward, and on the 9th, 10th, and 11th of August visited St. Lawrence Island. Landings were made at the various villages and careful search instituted for further information concerning the almost total depopulation of this island, as well as to prosecute inquiries in regard to the whisky traffic.

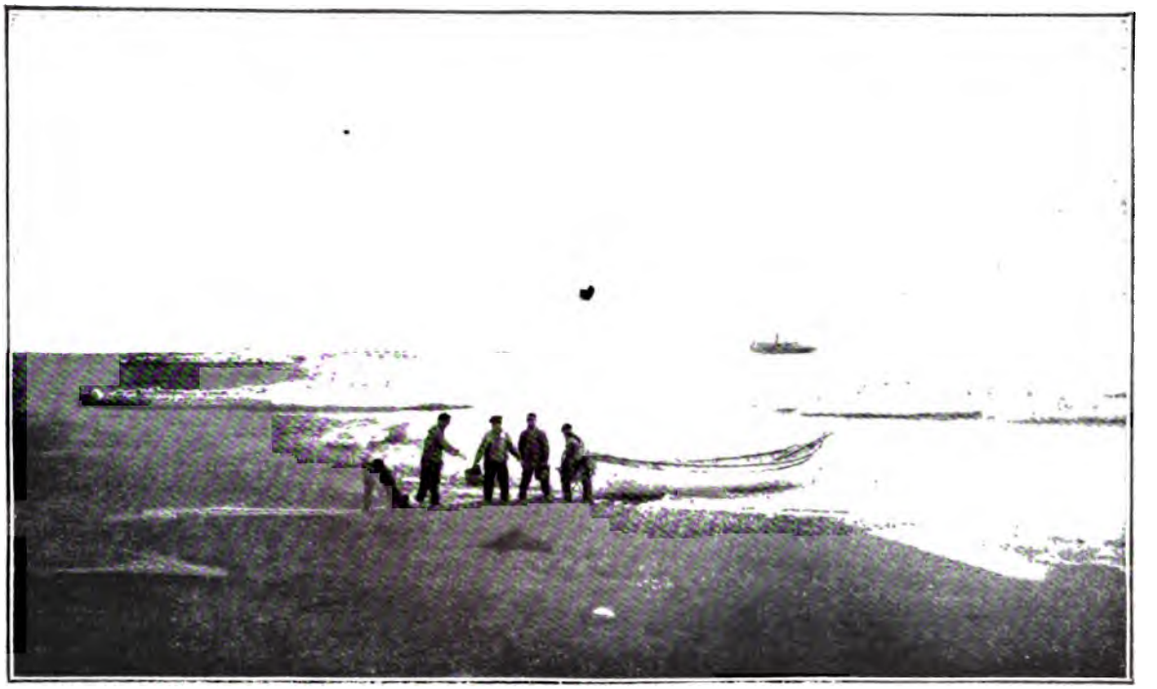
At the villages along the north shore no signs of living beings could be found, but the still-decaying bodies of these unfortunate Eskimos were lying in and about the falling houses, and weapons, sledges, and canoes were still undisturbed. No native will touch a thing belonging to the dead, and years hence relics of these people will be found here unless they are removed sooner by white men.

No new information of a positive character could be obtained, but I feel little hesitation in saying that the reports previously furnished the Department are in the main correct.

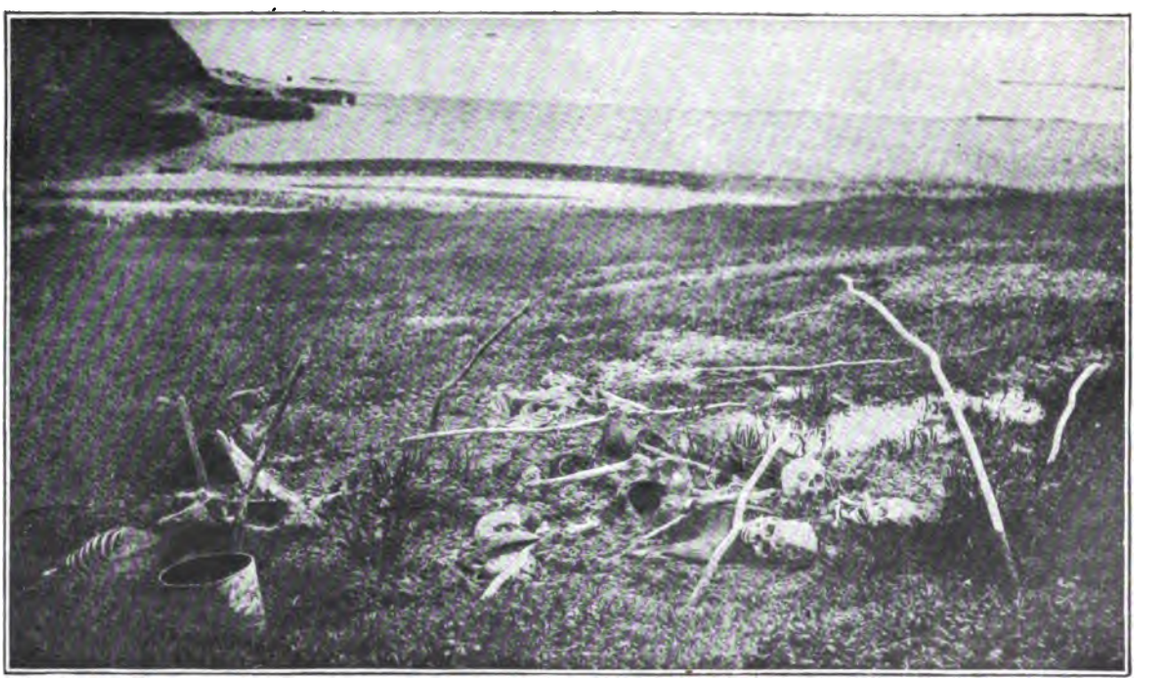
Tracking along the shore to the northwest end of the island, we stopped off the village of Tchiboukak, where the vessel was visited by a large number of natives. I was pleased to note their healthy, cleanly, and prosperous condition, their full forms and faces showing that food was plentiful. A visit to the shore brought to light large stores of dried fish and other eatables, and this, together with their excellent clothing, convinced me that they had taken warning by previous experience and furnished positive evidence, without the necessity of believing native assertion, that the whisky trader had not carried on his nefarious traffic the past two seasons.

The publicity given by the Revenue Marine to the effects of this vile trade had probably induced the traders to keep away.

On the 12th we reached Port Clarence. I found here on board the ship *Syren* four deserters from the whale-ship *Dawn*, who had come to the coaling station in a destitute condition. Captain Crocker, of the *Syren*, informed me that he did not have sufficient supplies to warrant his retaining these men on board his vessel, and believing that they must starve if left on shore, motives of humanity prompted me to take them on board. After having coaled and watered ship, we left, August 15, for Kotzebue Sound. The whole shore of the sound was skirted in search of illegal



WATERING SHIP AT CAPE THOMPSON.



A SAD STORY.

traders, and stops were made at Cape Deceit, Chamisso Island, and Hotham Inlet, but no signs of traders were found.

August 20 we watered ship at Cape Thompson, and proceeding on to Point Hope we picked up Lieutenant Howison and boat's crew. Mr. Howison had boarded what vessels had come to the point without finding trade liquor on board, and had not been able to detect any attempt at illicit trade. From Mr. Howison I received a letter that had been written me by Capt. E. E. Smith, master of the late steamer *Bowhead*, informing me that he had been crushed by the ice thirty miles to the northward of Icy Cape, stating that he was in a destitute condition, and requesting the aid of the *Corwin*. Notwithstanding the thick fog that was prevailing at the time, we proceeded at once to the northward, arriving at the coal mine near Cape Sabine (where Captain Smith informed me he was) that night. On the following morning, with Captain Smith on board, our northern course was resumed. Captain Smith made me acquainted with the following facts concerning the loss of his vessel, which I give as nearly as possible in his own words:

"On Monday, August 11, 1884, at about 9 a. m., in latitude 70° 32′ north and longitude 161° 27′ west, and in 10½ fathoms of water, the *Bowhead* was made fast to a large cake of floating ice, starboard side to. There was a light northeast breeze blowing at the time and a current setting to the southwest at the rate of half a knot per hour. Fires were hauled and the boiler partially blown down for the purpose of repairing seventeen leaky tubes from which the water was running so rapidly as to flood and overrun the ash-pans. At meridian the wind had fallen to a calm and the weather had cleared up fine. At about 3 p. m. a cake of ice, drifting with a northeast current of about two knots, was observed coming towards me.

"When about three-quarters of a mile distant I first perceived that it was liable to come in contact with us. I immediately proceeded to run lines and warp the vessel toward the eastern end of the cake to which she was attached, the end being but about two hundred yards distant. When within two-thirds of the ship's length to the end of the ice, the two cakes collided, nipping the vessel between them, raising her bodily, and heeling her at an angle of forty-five degrees to port. Then, as the ice began to give way, a sharp corner was brought against the port side six to eight feet forward of the mizzen rigging, staving a hole below the water-line and between decks. Another point took against the rudder-post, stern-post, and deadwood, breaking the rudder-post off at the water-line, forcing the deadwood up at a right angle to its position, bending the shaft to starboard, and splitting the sleeve and a three-inch seam in the stern-post from the main transom as far down as I could see. The crushing of the ice, the crashing of the timbers, and our appalling condition were enough to shock the strongest nerves, and, to add to the difficulties of our position, within five minutes of the collision a thick fog shut down, bringing with it a fresh southwest wind. The vessel began to make water immediately, and so rapidly that the engineer was unable to reach the valves of the donkey-pump, which were near the bottom of the vessel. It being evident that nothing could be done to save the ship (there being fifteen miles of packed ice between her and the shore), I at once proceeded to get the boats on the ice and prepared for leaving the ship, securing what provisions and clothing I could, as well as nautical instruments, ship's papers, log, etc.

"In a few minutes the cakes separated, the vessel then righting to an eight to ten degrees list to port.

"After much difficulty we succeeded in getting the boats to the edge of the ice, where we could launch them. By this time, about 5 p. m., the fog lifted, and we were delighted to see two steamers about four miles distant to the westward. Signals of distress were set, and, launching our boats, we proceeded towards the vessels, abandoning the ship. Seeing our signals, the steamers, which proved to be the *Narwhal* and *Bœlena*, met us, took us on board, and steamed towards the wreck. On our arrival at the *Bowhead*, there being danger of the vessel's masts sinking our boats in case she fell on her beam's ends, the wreck was towed clear of the ice and then boarded in the hopes of saving provisions. We found so much water in the hold, however, that we were unable to move anything of value. Thick fog had now set in again. The vessel settled rapidly in the water, owing to the quantity of coal and iron in her, and deeming it dangerous to remain in proximity, it was determined to leave her. The last seen of her was at about 7.30 p. m., and the water was then over her port rail and up to the port side of her main hatch coamings. Dividing

the officers and crew up between the *Narwhal* and *Bælena*, these two vessels steamed to the southward for the purpose of obtaining the relief and assistance of the U. S. steamer *Corwin*. At about 8 a. m. on Wednesday, August 13, the fog lifted (it having been thick since leaving the wreck), and we found ourselves about fifteen miles northeast of the coal mine near Cape Sabine."

After leaving Captain Smith and a boat's crew the *Narwhal* steamed to Point Hope for the purpose of transmitting the news of the wreck to the *Corwin* through Lieutenant Howison.

The *Bowhead* was one of the strongest and best-built vessels in the fleet. She was but two years old, was constructed expressly for the service in which she was employed, and was one of the last vessels that one familiar with Arctic voyaging would suppose would have an accident happen to her; yet in ten minutes she was a total wreck, and her officers and crew had only time to escape scantily clothed. She was commanded by Capt. E. E. Smith, formerly ice-pilot of the a man with the reputation of being second to none in skill and knowledge of Arctic *Corwin*, navigation.

At 3 p. m. of the 21st we reached the ice, the dense fog which had been prevailing having prevented its being seen until we were close upon it. From this time until near midnight of the 22d we were working to the northward through ice that continually grew heavier as we advanced. Our progress was slow and laborious and was rendered doubly hazardous by changing currents and thick fog. At 11 p. m. the vessel was brought to anchor under Point Belcher near several vessels, their presence having been made known to us by their bells. These vessels were immediately boarded for the purpose of finding out the whereabouts of the crew of the *Bowhead*. I found considerable excitement existing on these vessels, owing to the fact that several of the fleet were supposed to have been carried by strong currents and drifting ice into the pack, and if such was the case their loss was certain. Upon learning that the wrecked crew had been divided among the other vessels and were therefore perfectly safe for the time being, I resolved to satisfy myself of the truth of these alarming rumors and to offer all possible assistance to such as might require it. The bark *Helen Marr* having anchored close inshore where drifting ice in a rapidly-moving current was liable to drag her ashore, was, upon the request of her master, towed to a safe position. One by one the missing vessels were sought out until all were known to be safe. All of this duty was performed among heavy ground and drift-ice and between the shore and main pack, the latter being only from six to fifteen miles distant from the former. Extreme care was necessary in handling the vessel while working through these leads. I returned to the bark *Dawn* the four deserters belonging to her whom I had received from the ship *Syren*. I received from the same vessel two of the *Bowhead's* crew. On the bark *Wanderer* one more wrecked man was found and three were taken from the steamer *Orca*.

The good services of our surgeon were called into requisition to attend one man on the *Dawn*, three on the *Fleetwing*, and three on the *Hunter*.

At 5 a. m. of the 24th the steamer *Thrasher* was spoken and two of the wrecked men were taken from her. At 7 a. m. two vessels apparantly in a dangerous position close inshore were observed and immediate steps taken to reach them. After considerable difficulty and encountering no little danger we got near enough to speak them and found them to be the *Gazelle* and *Mabel* Although firmly embedded in the ice, their masters did not consider their position one of peril, and the *Corwin's* head was again turned to the northward.

During the afternoon of the 24th the wind had been freshening up from the westward with snow squalls and overcast, threatening weather, and by the time I had reached latitude 71° 17′ north (ten miles distant from Point Barrow) I found further progress impossible.

The pack was now moving inshore, and the leads began to close so rapidly that I found it necessary to order increased speed and carry all sail to escape from the imminent danger that threatened us. Just before we turned the steam-whalers that had ventured to the northward with us became alarmed and an exciting race of twenty miles between ice and steam commenced.

The leads most clear of ice were sought with as much care as the necessity for haste would permit, but large cakes of ice frequently almost blocked up the way. Down through the narrow passages, with rapidly turning screws, long streams of black smoke stretching out over the quarters, and all fore-and-aft sail bellying to the stiff southwest breeze, the steamers were pushed for a position of safety. Now one would go full speed into some large piece, and when almost brought

POINT BARROW NATIVES.

to a standstill the cake would split and the two parts shoot from each other in separation; again some vessel would come to a standstill in an unruly piece, and a following vessel would shift her course and strike the binding ice with such judgment and skill as to loosen the former and yet not stop her own progress; now one vessel would slide broadside up on a huge piece and roll covering-boards under, while another would force her bows high up out of the water until the ice broke and the pieces were forced up from under her bottom. On board these ships little noise was heard except the orders of the officers. What conversation was carried on was in an undertone, the excitement being so intense as to check the naturally loud tones of the sailors. Each saw and appreciated the danger, and with one accord drew a long breath of relief when a place of apparent safety had been reached. At 7.35 we had got inside the ground-ice and made fast to a large floe, Point Franklin bearing south, true, distant six miles. Here we were soon joined by the *Orca*, *Mary and Helen*, *Belvidere*, *Bælena*, and *Lucretia*.

At 7 a. m. of the 25th, having received from the *Bælena* eleven of the *Bowhead's* crew (making twenty-two all told, including the two men from the *Caleb Eaton*), rendered medical assistance to one man belonging to the steamer *Belvidere*, and taken on board the home mail of the fleet, lines were cast off and the *Corwin's* head was turned to the southward. Working through the ice under varying speeds, we reached the coal-mine near Cape Sabine at 11.30 a. m. of the 26th. Here we stopped long enough to take on board seven more of the wrecked men and proceeded to the southward, stopping at Cape Thompson to water ship. Here several dead bodies of natives were found in a house and about the banks of the stream. It is probable that they had partaken of some poisonous substance, as they had been well but a short time before. There was no evidence of violence and food was plentiful.

A prospecting party found evidence of a fair quality of coal in the bluffs forming the cape, but owing to the condition of the ground it was not possible to determine the extent of the seam.

On the 28th the *Corwin* reached Hotham Inlet, and on the 29th Lieutenant Cantwell and party returned on board. A report covering the operations of these gentlemen since leaving the *Corwin*, July 10, is herewith inclosed.

September 1 and 2 I coaled and watered ship at Port Clarence, having left the Arctic August 30. On the 4th I arrived at St. Michael's. Here I found the Golowin Bay miners, heretofore mentioned, and an army scout in the employ of General Nelson A. Miles, who desired to return to San Francisco. For reasons already given I was constrained to furnish them passage.

On the same evening I proceeded to the southward and westward, and on the morning of the 8th arrived at St. Paul Island. After anchoring I was handed a letter from Lieutenant Lutz, a copy of which has been forwarded to the Department.

I learned from U. S. Special Agent Glidden that there had been two other suspicious vessels about the islands and that one had been chased by Mr. Lutz. He fired upon her and his shots were returned, quite a fusilade being maintained for some time. At least one ball struck the pursuing schooner.

I desire to call the attention of the Department to the courage displayed by Mr. Lutz in boarding and seizing with but two men this well-manned and well-armed vessel, and to express my approbation of the course he has pursued throughout. The qualities of character that he has shown are such as I deemed him possessed of when I selected him for the important duty of guarding the islands.

Having taken on board the six white and nine Japanese prisoners left at St. Paul by Mr. Lutz on the 9th, I visited St. George Island. Mr. Glidden did not think the *Corwin's* presence was required any longer about the islands.

On September 10 I visited Bogoslov for the purpose of again examining the island and noting any changes that might have occurred. Quite a number of new features attracted our attention, and the report of Dr. Yemans on the subject is herewith inclosed.

On the 11th we arrived at Ounalaska. The presence of so many people on board (ninety-eight all told) had now so reduced the quantity of rations that I found it necessary to purchase provisions here. Properly certified vouchers for the amount of these bills have been forwarded to the Department.

Having learned that by proceeding to Belkofsky I could obtain definite information of violation of law, on the 12th I left for that place, arriving there on the 14th. The most searching inquiries, however, developed nothing. On the following day I cruised to the eastward, touching at Unga and Sand Point. On the 16th I visited Coal Harbor. While cruising about among these islands I boarded and examined all the vessels encountered, without finding evidence of other than legitimate trade.

September 20 I returned to Ounalaska, and received by the steamer *St. Paul* a letter from the Department under date of August 21, inclosing a copy of a letter from Mr. Moulton, a special agent at the seal islands. In reference thereto I would respectfully state that I had already boarded the schooner *Vanderbilt* without finding evidence of illegal traffic. Special Agent Glidden, at St. Paul, did not think there would be any trouble at that place, and I am satisfied if any raid is attempted on the seal rookeries that the Government force on the island is amply sufficient to prevent it if anything like a respectable lookout is kept.

From the company's agent at Ounalaska I learned that a new volcano had been seen by Captain Hague, of the steamer *Dora*, on Tchuginadok Island (one of the Four Mountains), in latitude 52° 48′ north and longitude 169° 55′ west. Volcanoes in active operation have frequently been observed in these mountains, but for the past four years they have been inactive. Whether the one reported is a new eruption or an old crater returned to activity the agent was unable to say. As much as I desired to visit and examine this phenomenon, the very crowded condition of the vessel and the suffering of my crew and passengers precluded the idea. At the date of my leaving, a day without rain was an exception in these latitudes, and severe storms were frequent. On September 24 one of the most severe gales that it has ever been my fortune to witness in these waters visited Ounalaska. In this small land-locked and mountain-walled harbor the water was lashed into foam by the fury of the wind; the air was filled mast-head high with moisture picked up from the surface, and it seemed almost impossible that the two chains by which we were moored could stand the shock of the descending "wooleys." The accommodations of the vessel gave shelter from rain, storms, and frosts to only one-half of the people on board at one and the same time; the men were scantily clad, and complaints to the surgeon were becoming every day more frequent. Fearing that an epidemic might arise from the damp and overcrowded quarters, inwhich opinion I was sustained by Dr. Yemans, I considered a return to San Francisco imperative.

There was no means of getting these people to San Francisco other than on the *Corwin*. The steamer *St. Paul* was bound to Petropaulowski, in Asia, and the steamer *Dora* had not space and would not sail until November. At Ounalaska accommodations and food for so large a number of persons could not be supplied for any length of time, and if there had been I should not have felt justified in leaving these people here unguarded where there is no protection of the law.

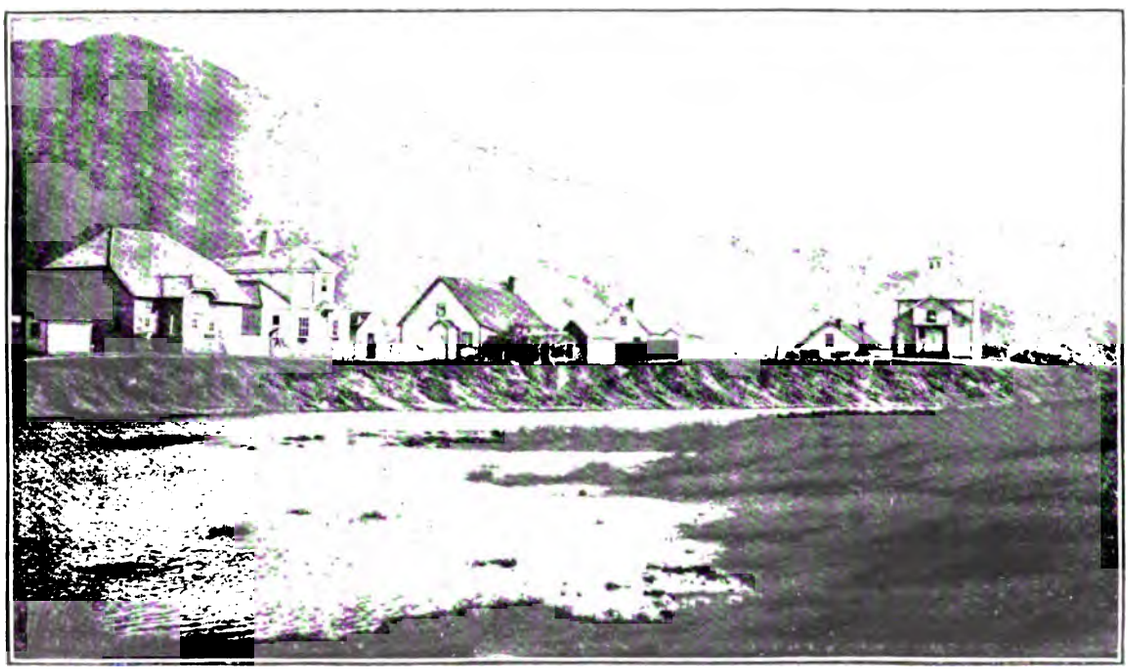
Having coaled and watered ship, I left for San Francisco September 25, arriving at the port of destination October 5, after an unusually pleasant voyage.

On my arrival I found that Lieutenant Lutz had brought the schooner *Adele* safe to this port, and had made arrangements for turning her over to the proper officers, in compliance with orders that I had issued for his guidance.

I wish to again call the attention of the Department to the injustice that is being done the harmless people of northern Alaska by depriving them of breech-loading arms. No evil results can come of the repeal of the law in so far as it applies to them, and a manifest act of humanity would be accomplished by so doing. They are a peaceful race. They have no tribal affiliations and no chiefs, their "omalik" being the head of a family. They live apart in small villages; communication is difficult, and their languages different. With the exception of She-sho-lik, a town on Kotzebue Sound, where they congregate during the summer to the number of twelve to fifteen hundred for the double purpose of catching salmon and white whale and trading, no considerable number of them are ever together, and it is not within the range of possibility that any combination can be effected for warlike purposes.

Again the wholesale slaughter of the walrus by whalers has so diminished the numbers of that aquatic mammal as to almost deprive these people of their main source of animal food. Those

OUNALASKA.



OUNALASKA.

that are left have become so wild that they can seldom be brought within range of the spear or shotgun.

Any one at all familiar with the use of arms knows how difficult it is to charge a muzzle-loading gun in cold weather, yet these natives of a polar climate are obliged by law to depend upon this weapon for their principal means of obtaining food and clothing where game has been largely decreased by the very people who forbid them the use of modern arms. In the winter a muzzle-loading gun, after being subjected to a temperature of sixty to seventy degrees below zero, can not be carried into a house or brought near a fire if loaded, as the frost in the barrel will dampen the powder and render the charge worthless.

Occasionally breech-loading rifles of the latest patterns are seen in their boats, and the white men coming in contact with the natives raise no objection whatever to their retaining these improved arms. I have no doubt that they have quite a number of these rifles in their possession, and to seize them would be an act of injustice, as the Indians have bought them in good faith and can not be made to understand why they should not have them.

For like reasons there should be no restrictions on the sale of cartridges. At present those having rifles are obliged to pay a price for cartridges to fit their arm so high as to almost be equivalent to the purchase of a new rifle.

I believe that no good argument can be adduced for keeping these weapons out of their lawful reach, while the dictates of reason and the promptings of human instincts would seem to demand their unrestricted sale. In this opinion I am joined by all who are acquainted with the habits, customs, and needs of these people, and quite a number of the whaling captains indulge in much unfavorable criticism of the law.

Until some action shall be taken on this subject, I would respectfully request that the Department fix upon some limit to the number of rifles and quantity of fixed ammunition to be used in walrus hunting and for the purpose of sustaining life in case of disaster that should be allowed in the outfits of vessels coming into these waters.

WHISKY TRAFFIC.

Owing to the continued and determined efforts of the *Corwin*, and notwithstanding the lax enforcement of the law regarding liquor permits to vessels clearing for this Territory, I am happy to state that the whisky traffic in northern Alaska has almost entirely ceased. The beneficial effects of our annual cruises are apparent in the changed condition of the Eskimos. Sickness has decreased; the people are better clothed; more attention is paid to their boats; food is plentiful; furs, bone, and ivory for trade are abundant, and the large number of healthy young children in every village dissipates former fears that the race might become extinct.

Satisfactory as is the present state of affairs, it can be continued only by constant and united work. If efforts to restrain the trade once cease the natural appetite of the natives for alcohol, aided by the white man's greed for gain, will soon cause it to revert to its former terrible condition.

Most of the whalemen desire to see its total suppression, as it places those men who, from conscientious motives and a desire to comply with the law, will not sell it at a disadvantage with the unscrupulous in competition for the trade in bone, ivory, and furs.

The natives fully understand that we come to suppress this trade and that no liquor can be got on board the *Corwin*, even if they beg for it on their knees, as they frequently have done. When they see our flag they point to it and say, "Oo-mĭ-ăk'-puck pē'-chuck ton'-ĭ-kă" (no whisky ship), and in describing us to others they generally use this expression. Naturally peaceful, of a kindly and hospitable disposition, and seldom, if ever, quarrelsome when sober, under the influence of a small quantity of liquor they become demoniac. The most brutal fights occur when they are in this condition. Their long, sharp hunting-knives make frightful wounds, and their rifles are used without stint and often with deadly effect. In former years our surgeon has often been called upon to dress these wounds. On the bodies of several Indians I have seen marks of bullet wounds received in these drunken brawls, and the omalik of the Diomedes, a comparatively young man, bears three deep scars which he proudly told me he had received in fights, and as proudly boasted of having killed two men while drunk.

The wives of these natives, who are usually treated with more consideration than we should expect they would receive from their savage lords, are frequently brutally beaten when liquor has frenzied the men, and it was with unmixed pleasure that, on the single occasion where we were called upon to make a seizure this year, I noticed that the women recognized us as their friends, used every exertion to assist us in our search, and seemed grateful that powerful friends were among them who were ready and willing to do what could be done to soften the hardships of their savage life. When I think that citizens of my own country have been the prime means of adding this great burden to the load these simple people have to bear, I feel that no exertion can be too great and no vigilance too exacting if it will but bring to punishment these unprincipled traders. If captured, no leniency should be extended to them.

The only trouble that has ever occurred between the whites and natives has been when the latter were under the influence of liquor. There is a grain of consolation in the fact that usually those who furnished the whisky were the ones to suffer.

In order that the Department may be fully informed of all phases of this nefarious trade, I would state that some of the "whalers" had been accustomed in the "between seasons" to purchase in Honolulu, and in the summer to sell in these waters, a vile compound called Honolulu rum, thus adding to their violation of the Indian trade law the crime of smuggling. This liquor is useless as medicine, serving it to the crew would be a species of villainy, and its presence on board should subject a vessel to seizure, as it virtually carries with it the intention to trade. Two or three of the whaling captains openly boasted of having thrown overboard one to two hundred gallons of this rum when they heard the *Corwin* had reached the Arctic before them.

I would respectfully recommend that the Department fix upon some quantity of liquor as sufficient for ship's uses and medicinal purposes of these vessels; that the present law in regard to procuring a permit to carry liquors from a collector of customs be rigidly enforced, and that masters of vessels be required to carefully account for every gallon they take on board. Vessels then found in these waters without a permit or with more than the authorized quantity of liquor on board can be seized and sent to San Francisco.

At present it is exceedingly difficult to determine what quantity of alcohol should subject a vessel to seizure, and I should hesitate to break up what might be a profitable voyage for a small quantity of liquor that perhaps might be considered reasonable by another.

CENSUS OF ESKIMOS.

It is almost impossible to arrive at anything like a correct estimate of the number of natives in the Territory of Alaska. The people are migratory and during the open season of the year are in the interior hunting. With the exception of Shē-shä-lik, a village near Hotham Inlet, already mentioned, the settlements are nearly depopulated. The native idea of numbers is extremely vague and no dependence can be placed upon their estimates. As a result of my observations, covering a period of nearly fifteen years, I should say that there was not far from 3,000 of these people living along the coast and about 20,000 altogether in the Territory.

We can obtain more definite information in regard to the Aleuts and Creoles by means of the Russian Church statistics. These people are gradually falling off in numbers and there are now about 3,800. This decrease is probably due to the introduction of new diseases, consequent upon their association with whites and changes in habits and methods of living. Whether or not they will continue to decrease until they gradually become extinct, as has been the case with our eastern Indians, or finally reach a stage where their constitutions become accustomed to civilization and increase again, is an interesting problem that only time, of course, can solve. That they take more kindly than the native American to our methods of living is more than evident, and perhaps with proper fostering care on the part of the Government they may become fully civilized and the race may be preserved.

ATTOU ISLAND.

Attou is no longer of any importance, and I would repectfully suggest that hereafter the question of an annual visit there be left to the judgment of the commanding officer of this vessel. Its principal importance has depended on the number of otter taken there. Last year but twenty

NATIVES AT SHESHALIK, KOTZEBUE SOUND.

ESKIMO CAMP, KOTZEBUE SOUND.

were captured altogether, and I understand that the natives are to be removed elsewhere this fall, it having been demonstrated that a continuation of the settlement was unprofitable. The crowded condition of the *Corwin* prevented a visit there this year, but I am confident it would have been fruitless in results if made.

VALUE PLACED UPON OUR SERVICES BY WHALEMEN.

That the whalemen fully appreciate the services of the cutter in Arctic waters is beyond question. On every side one hears favorable comments on the spirit of enterprise that has led the Department to send one of its vessels yearly to these waters with the partial object in view of being of assistance to whalemen in case of disaster. The former distrust and professional jealousy of the service, due to the natural dislike men have of being kept under surveillance, have almost entirely disappeared, the fact being generally recognized that we are friends in need, and while we will conscientiously uphold the laws we have taken an oath to enforce, we are ever ready to be of such assistance as lies in our power to those who are in danger or distress.

As soon as the *Bowhead* was crushed steps were taken to communicate with this ship, and I believe that I am justified in saying that the prompt response of the *Corwin* merited the meed of praise that she has received. Pushing to the northward through fog and snow and ice, her efforts to be of service did not cease until the northern limits of navigation had been reached, the wrecked crew all on her decks, and every vessel in the fleet found to be safe.

While among the fleet the services of our surgeon were daily called into requisition to attend the sick and disabled. In a climate so rigorous and in the pursuit of a business so liable to accident there are cases occurring frequently that require more than the simple attention of a master of a vessel. We have been able to supply this need, and I am pleased to report that I believe the amount of good accomplished has far more than repaid the outlay of time and attention and has been fully appreciated by those upon whom it was bestowed.

THE SEA-OTTER.

This fur-bearing animal is gradually leaving the grounds it formerly frequented and is now being found principally on the kelp banks outlying the Choumagin Islands, in the vicinity of Cape Flattery, and even as far south as the coast of California. The persistency with which they have been hunted by the natives, by whites married to native women, and by vessels fitted out for that purpose has materially reduced their numbers and caused them to seek safer feeding grounds. Not only have these hunters used the breech-loading rifle in taking this animal, but I am credibly informed that nets made of salmon-twine, set *en échelon* along the beaches where the otter is accustomed to haul out, are now being used. If this practice is continued for a few years longer none will be found among the islands, and, as the Aleuts live almost entirely upon the profits derived from the sale of the skins, extreme poverty, if not actual starvation, must follow upon their extermination.

Quite a number of breech-loading arms are in the hands of the people here, and more are being brought in each year. Some are smuggled in by fishermen and other vessels coming here, and the large extent of territory precludes the possibility of stopping it entirely. Every year a few are brought in on permits obtained by parties in San Francisco, and either the persons who obtain these permits allow others to use them or on leaving the Territory are tempted by the high price of arms to dispose of them. This evil may be remedied somewhat by the presence of another vessel in these waters, but that it can be wholly stopped under the present law is extremely doubtful.

Allowing white men who are married to native women to hunt is but offering a premium for bigamy and desertion. While the law is commendable in theory, it will not work in practice. Unprincipled white hunters, tempted by the great value of otter skins, come here and marry the simple girls, force them to accompany them on their hunting trips and do their cooking and work for them, bring two or three children into the world, and then leave their families to get their living as best they can, while they themselves return to enjoy their earnings with other wives in

civilization. There is not one chance in a thousand of these criminals being brought to justice. The machinery of the law in this Territory is not yet in such working order as to hunt out and arrest persons guilty of such offenses, and it is extremely doubtful if it reaches that perfection for years. That the country is so isolated, so sparsely settled, and the language of the natives so difficult to acquire, are all obstacles that will prevent the enforcement of the marriage laws.

WORK FOR TWO VESSELS.

The rapidly increasing interests of this portion of the country, in conjunction with the necessarily widely spread operations of the service, demand the presence of another vessel in these waters during the summer months in order to properly enforce the law and protect Government rights. It is simply impossible for one vessel to prevent illicit trade and succor distressed seamen in the Arctic, and guard the seal islands and stop the illegal taking of otter and introduction of arms on the coast of the Alaskan peninsula and among the adjacent islands. These two theaters of action are a thousand and more miles apart, yet the nature of the duty to be performed in both is such that the same attention is demanded at the same time.

During the cruise of this year I have not been able to give the attention I desired to the southern portion of the cruising ground, and I should not have been able to do so even if our assistance had not been required by the *Bowhead.*

The Department is fully aware that, as nobly as this little vessel has accomplished the work placed upon her, her accommodations are wholly insufficient to meet the requirements of the service, and it did not require the convincing circumstances of this year to demonstrate the necessity of a larger vessel; but that such a vessel, even if she be as large as a man-of-war, can cover the whole ground, as seems to be the opinion of some, is an absurdity that only requires a comparison of the duty to be performed with the territory requiring attention to make it manifest.

It is my judgment that with one vessel to cruise from the seal islands to the northward and in the Arctic, and another to cruise from Sitka to the seal islands, the ground can be covered as it should be, and that the increased efficiency with which Government interests would be guarded would more than justify the additional expense.

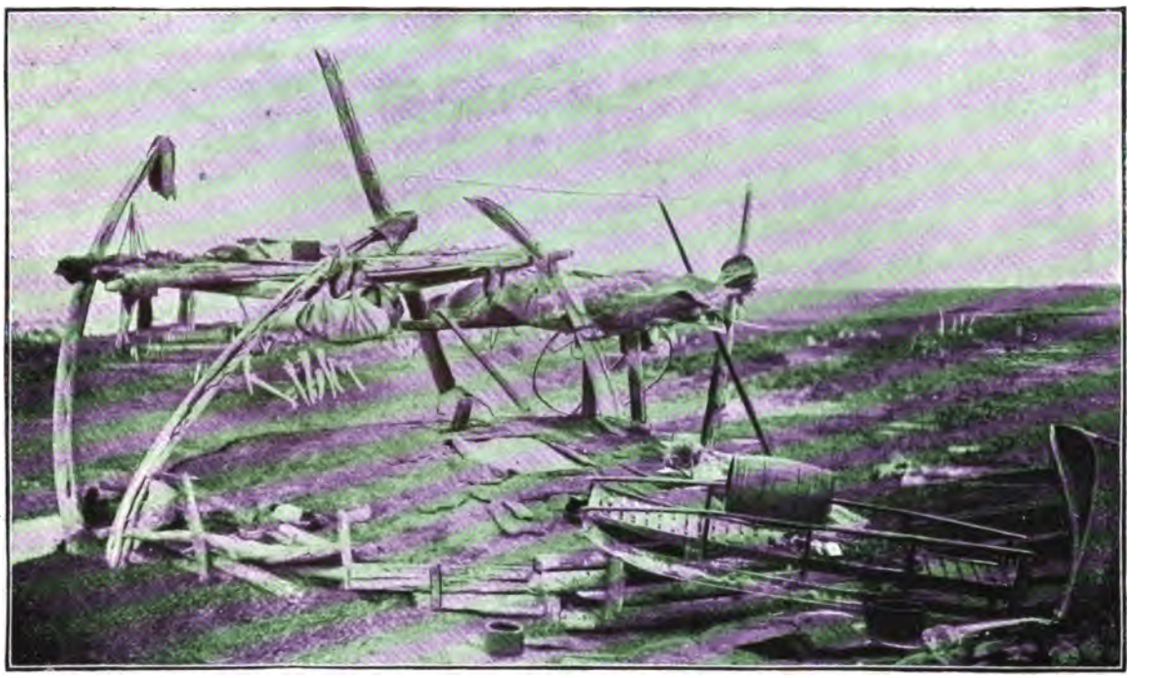
STEAM-LAUNCH.

The *Corwin* is entirely too small to carry a steam-launch. It takes up one whole side of the quarter-deck room that is needed in handling the ship—and the usefulness of the one we now have is limited. The boiler and machinery are so heavy that it can not be used in rough water; if sent on a boat expedition it carries an insufficient supply of fuel and can not be hauled up on the beach, and it can not be lowered or taken on board in a sea-way without great risk of being broken up. If obliged to desert ship we would have to abandon it, and a well-fitted sail-boat would be, in every respect, more useful and desirable.

SCIENTIFIC REPORTS.

During our cruises in these waters many items of general interest and facts that would be of value to the scientific world can undoubtedly be collected, but some one thoroughly familiar with the subjects to be handled and in collecting and arranging data should accompany the vessel for that purpose. My mind is so occupied and engrossed with the care of the vessel, and my system so burdened by fatigue and exposure incident to the discharge of my duties, which frequently require my presence on deck almost continuously for days, and at times twelve, eighteen, and even twenty-four hours at the mast-head, that I am wholly incapacitated for reading or noticing with proper care events that come under my observation.

At present I am obliged to assign the various subjects to those of the officers that I deem most competent to handle them. While on watch the attention of the gentlemen must be wholly given to the ship, and when below the performance of their multifarious professional duties



NATIVE HOUSE AT POINT HOPE, ALASKA.

GROUP OF ESKIMOS, POINT HOPE.

requires the larger portion of such time as they are not unfitted for mental work by the effects of the chill of the damp, icy atmosphere.

Special preparation is necessary in order to properly qualify one to do any of these subjects justice, and officers of this service have neither time nor opportunity for such study. It is my opinion that the interests of the vessel would be better served and the results would be more satisfactory to the Department if a chronicler was assigned to this vessel during the cruises and until such time as complete reports could be forwarded.

The shotguns purchased by authority of the Department before we left San Francisco have proved to be of the greatest value and are an acquisition to the ship that I should be loath to part with. They have enabled us to obtain game for all hands aft, a matter of no small moment in these latitudes, besides being the mainstay upon which we should have to depend in case of accident to the ship. No vessel, and especially one belonging to the Government, should go to the Arctic without them, as the lives of all on board are rendered doubly secure by their presence. With these guns, plenty of ammunition, and the assistance of the natives, a wrecked crew might remain in the Arctic over winter with comparative safety.

CROWDED CONDITION OF VESSEL.

No description can fully convey an adequate idea of the crowded condition of the *Corwin* on her homeward trip this season.

In my cabin were Captain Smith, of the *Bowhead*, and Mr. Hawley, superintendent of the Omalik Mining Company, an old gentleman, to whom I granted this privilege out of respect for his years and consideration for his feeble condition.

In the ward-room were eight officers, the surgeon, pilot, and chief officer of the *Bowhead*. Three of the state-rooms having double berths had two officers in each, and in the area of the ward-room were three swinging cots that completely filled its beam. The officers in turning in and out had almost to crawl on their hands and knees to get under these cots. There was not room at the ward-room table for all to eat at once. The second officer of the wrecked vessel slept in a locker out of the engine-room. The master of the seized schooner and one of the white prisoners slept in the pilot-house. One of the miners slept in the steam-launch. Two firemen slept in the shaft-alley and three or four men in the steam-drum room.

Four Japanese slept in the paint locker and on coils of rope under the top-gallant forecastle. The sail locker on the berth-deck was cleared out and two berths put in it, and this, together with the petty officers' rooms, was filled with the officers of the wrecked vessel. The two quartermasters slept in their locker. The rest of the men were divided into watches, but when one watch was below, together with our servants and those who stood no watch, the hammocks were all full, the lockers on both sides were filled with sleepers, and quite a number of them had to place their blankets on the deck.

In order to feed them it was necessary to spread three sets of messes and about two hours were required at each meal. The cooking accommodations in the galley were sadly deficient. The decks were constantly wet either by rain or the swash of the sea, and opportunities for drying or airing the quarters, forward or aft, were few.

Everything that we could possibly do to make these people comfortable was done, but the bad weather which we experienced, combined with the narrow limits of the ship, rendered their condition anything but pleasant. Notwithstanding the many discomforts and hardships which they were obliged to undergo, the wrecked men seemed to appreciate the fact that we were doing all we could for them and kept cheerful under the trying circumstances to which they were subjected.

It gives me pleasure to testify to the manner in which our own crew suffered the inconveniences to which they were put by having so many strangers on board. With that forgetfulness of self that so characterizes a sailor when brother mariners are in distress, they seemed to vie with each other in rendering the wrecked men comfortable and to feel that a portion of the credit of assistance belonged to themselves.

NAVIGATION, WEATHER, AND CURRENTS.

In my previous experience in the Arctic I have never seen a season like the past. From the time of first reaching the ice up to leaving the Arctic dense fog has been almost constant. Currents that have hitherto been considered permanent in direction, if not in force, have become erratic, and others have entirely failed. The ice fell back before the sun's advance slowly and compactly. For three weeks after we reached the Diomede Islands it refused entrance to Kotzebue Sound, and three weeks later still it was hanging with discouraging tenacity around Point Hope. It was unsafe to anchor with any but a short scope, moving steam had to be kept, and constant vigilance exercised to prevent being dragged ashore by fields of ice moving in the rapid and changing currents. For weeks at a time it was impossible to take observations, dead reckoning was almost worthless, owing to the continual changes in force and direction of the currents, and the safety of the ship depended entirely on the constant use of the lead. Fortunately for those who are obliged to sail this frozen ocean, the depth of water is not so great but what bottom can always be obtained, and the proximity of land is indicated by regular shoaling with but few exceptions. Yet with this aid and the best charts that we have, several years' experience is necessary to enable the navigator to judge with any degree of precision the position of his ship. Any one at all familiar with coasting knows how difficult it is to recognize land in a fog where marks are well defined—high bluffs often appearing like low beaches and small rocks looming to gigantic size, while the general contour of the small portion of shore visible may be taken for almost any land that one expects to make. How much more difficult must it be where the formation of the shore for miles differs but little, as is the case in the Arctic.

Among the best landmarks that we have in these northern waters are the bird rookeries. There is one at King's Island, one at the Diomedes, one at Cape Seppings, one at Cape Thompson, and one at Cape Lisburne. The distance between these rookeries enables one to form a very accurate idea of the one he is approaching, while the cries of birds congregated at them admirably answers the purpose of a fog-signal. With one or two exceptions these are the only aids to navigation in this foggy, unsurveyed, and dangerous sea.

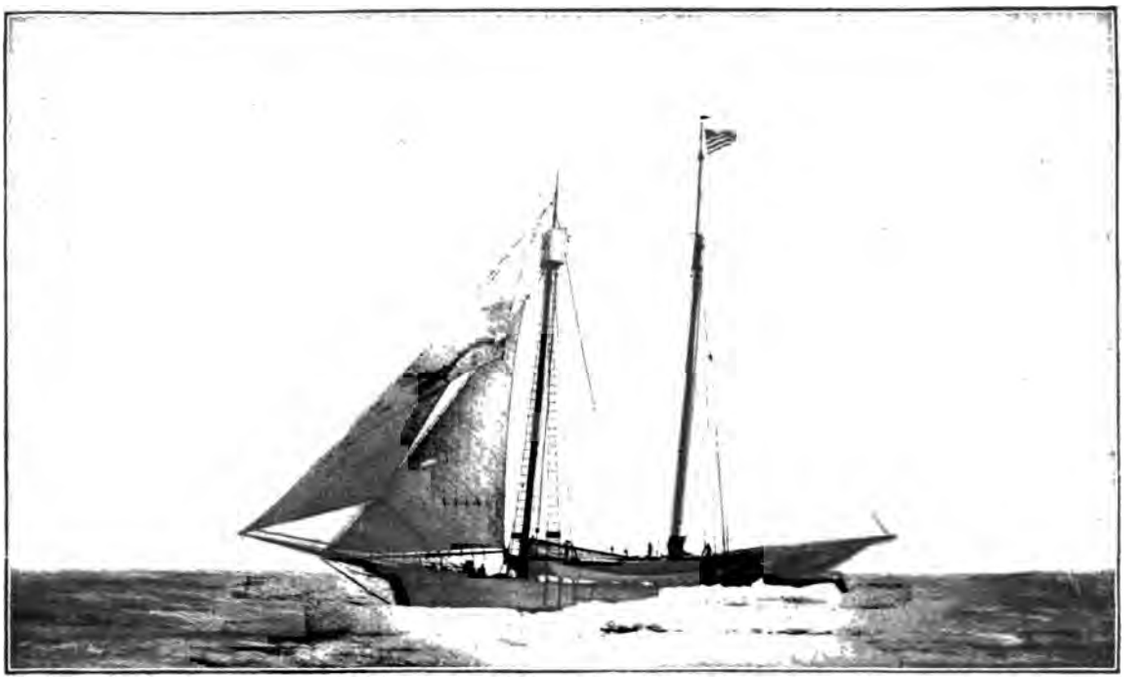
In the shallow waters of this ocean the effect of the wind on the currents is, perhaps, more marked than in any other portion of the globe. A moderate wind of but few hours' duration will produce a current in the direction in which it blows and change the set and velocity of all currents within its range. The quarter from which a coming wind will blow can usually be foretold several hours by watching the drift of the ice in the vicinity of the ship. It is unsafe to lay down any rules or assert that any current will be found to be setting in a specific direction. The shipmaster must exercise constant vigilance, pass sleepless nights, note and intelligently interpret the smallest changes in wind, weather, and sea in order to insure with any degree of certainty the safety of his vessel.

It is work like this, together with exposure to the severity of the climate, that soon ages a man and breaks down his constitution. In the whaling service the wear and tear upon the systems of officers coming to these waters is recognized and compensated, masters of vessels frequently receiving seven to eight thousand dollars per year and their mates in proportion, the amount, however, depending on the number of whales caught. It is the prospect of receiving such large pay that induces men to run the risks and endure the hardships of Arctic voyaging.

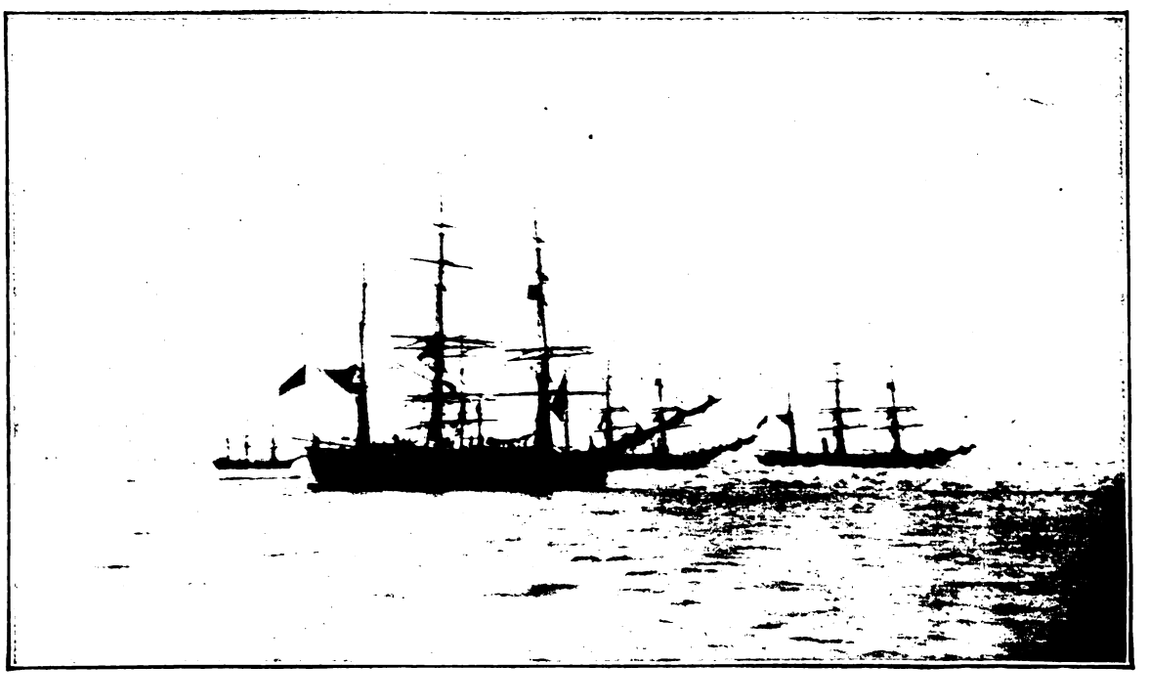
Inside the Arctic circle snow has fallen all the past season, and it may almost be said that there has been no summer. As late as August 27 ice was within a few miles of Cape Sabine and at the Sea-Horse Islands it was heavy and dangerous.

The pack at this time was still to the southward of Point Barrow, and there were few indications that vessels would be able to go to the eastward of that place this season. During the latter part of our stay the weather was exceptionally severe. About the Fox Islands heavy storms were frequent and rain almost incessant. Advices received in San Francisco since my arrival confirmed my opinion as to the vessel's being able to weather Point Barrow this year.

As only experience in these waters can qualify an officer for taking care of a vessel in them, I would respectfully suggest to the Department that there should always be on this vessel one officer who has served during two cruises and one, one cruise.



TRADING SCHOONER SAN JOSÉ IN THE ICE.



WHALERS IN FLOE ICE, ARCTIC OCEAN.

THE ICE.

Among the ice terms in use by whalemen and those frequenting the Arctic on this side of the continent the following, with their significations, are the most common:

A *floe* is a large piece of floating ice.

A *field* is a large body of ice that can be seen around.

Land-floe is ice frozen fast to the shore.

Packed ice is small pieces closed together and held by the pressure of wind and currents.

Ice-blink is a peculiar pale yellow reflection on the sky and indicates the presence of ice at a distance.

The *ice-pack* is that large body of solid ice extending across the whole sea and beyond which it is impossible to advance.

Slack ice is detached so that it can be worked through. Ice is said to be *slacking* when it begins to open so as to be navigable.

Ice is said to be *nipping* when it begins to close by reason of the action of winds or currents so as to prevent the passage of a vessel.

Ice is *calving* when small pieces break off from the bottom and rise to the surface of the water.

A *lead* is a strip of navigable water opening into the pack.

A *pocket* is a short opening into the ice and terminating against solid or thick ice. This is also sometimes termed a *blind lead.*

Hummocky ice is rough, uneven ice.

Porridge ice is small, finely ground-up ice.

Young porridge is ice just forming.

Waking is the following of another vessel through leads and slack ice.

Bucking is backing off and ramming ice in order to break a way through it.

Tracking is following along the edge of the ice-pack.

The experience of many years in the Arctic has demonstrated the fact that no rules whatever can be given as to the time of the breaking up of the ice. The severity of the winter, the time at which spring weather opens, and the beginning of southerly winds that break up the ice, all have their influence in governing this time. Vessels have been able to enter St. Michael's as early as May 21; this year we found ice to the southward of St. Matthew's on June 2, and some days later still in the season vessels have been stopped by it between the seal islands and Nunivak. The southern limit of the ice is almost entirely dependent on the severity of the winter. Heavy southerly winds and swell will break up the ice, and if followed by northerly winds it will open out and the waters become navigable. When once broken up, if the weather is mild, it will not cement again if nipping, and consequently will open more readily to light winds. In consequence of the time of the breaking up of the ice being so variable, no definite time for the cutter to be in the Bering Sea can be given, but she should be there in season to enter the Arctic with the fleet or otherwise her mission will be rendered futile.

Northeast winds tend to drive the ice off the American shore and westerly winds off the Siberian side. With these few exceptions little can be said of ice conditions.

In clear weather the ice-blink indicates the presence of ice and it may be seen a great distance, but in thick, foggy weather approach to the pack must be made with great caution. Its proximity is usually indicated by the slack, and when this once begins to be seen about the vessel it may be judged that a large body is not far distant. As the pack is neared one sees only ice as far as the eye can reach. It rises from ten to twenty-five feet above the surface of the water, in all manner of fantastic forms and shapes, presents all colors of blue, from an indigo to an almost white, and glistens in the sun's oblique rays with a splendor blinding to the naked eye. It is a well-known fact that the depth of water and surrounding features of this ocean render the formation of gigantic icebergs an impossibility and no mountains of ice add the sublimity and terror of their presence to the pack, yet there is in this harmless-looking body that which man can never conquer. Inside its solid front no vessel can penetrate and once caught within its grasp it is almost a miracle that she ever escapes. No ship can be built that will stand its crushing force, and no ram be made so powerful as to break its way through it. It is only when the elements combine against it that man can invade its domain.

When a pack is reached it usually becomes necessary to track along its edge to find a lead. Whoever is piloting the ship takes his place at the mast-head, and with glass in hand seeks for a favorable opening. Oftentimes days are spent working up and down along the ice without clear water presenting itself, and when it does extreme caution must be used in entering the lead. It is here that the judgment and experience of the ice pilot become a necessity. The weather, currents, appearance of the ice, probable winds, and a dozen other things that would never enter the mind of the novice, are to be taken into consideration before the vessel's head is turned into the

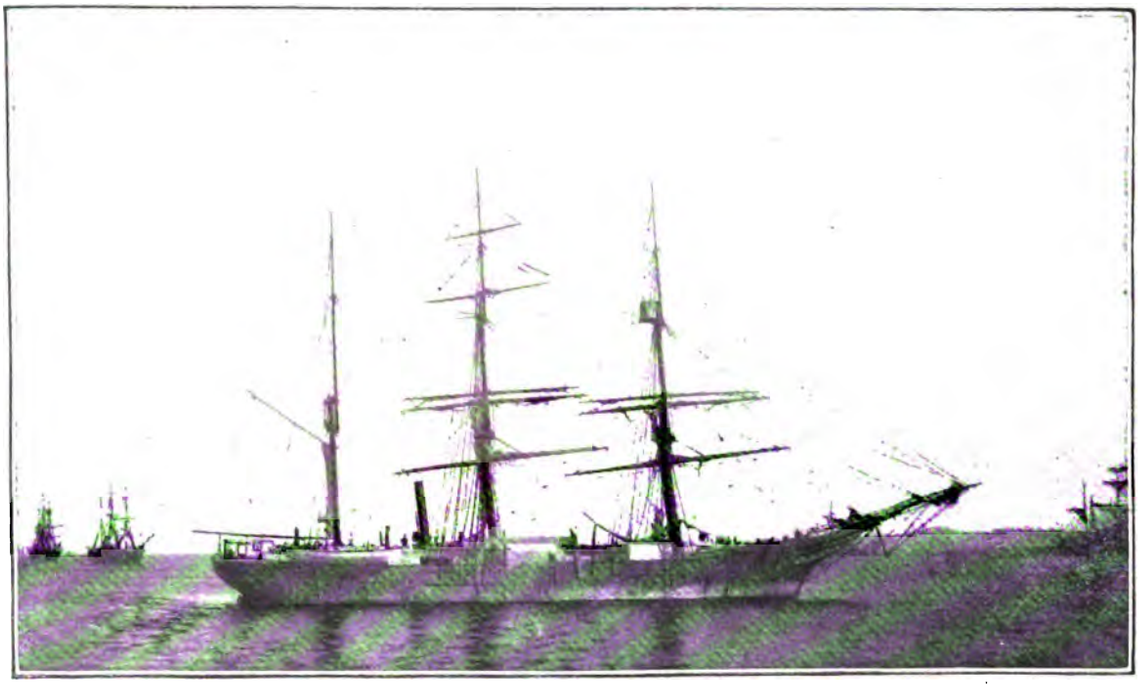
pack. Once it is determined to enter the lead vigilance must be doubled and every faculty kept on the alert. The vessel is conned from the mast-head, and while directing how the helm must be put to keep clear of immediate danger, the pilot must be looking ahead for the clearest water, and watching ice, sea, and sky for change of currents and winds. If any signs of the closing of the lead are presented, the vessel must be got out as soon as possible, for if shut in, and she escapes being crushed, she will go to the northward in the drifting pack from one to two knots per hour, and it will become necessary to abandon her. If the lead followed up is between the ground-ice and the pack, and the wind comes on shore, a safe place can sometimes be found behind the ground-ice. A vessel may be made fast to this ice with grapnels, or anchored to leeward of it, and lay with comparative safety. If anchored in a current, however, with drifting ice about her, the scope of chain must be short, and everything kept in readiness for getting under way at a moment's notice. If anchored in shoal water it is desirable to get into the ice as far as possible to avoid the swell, but if the water is deep the ice should be avoided. Generally the presence of ice tends to kill the swell, and it will be found much smoother inside the ice than out.

The bowhead whale keeps as far to the northward as he can find spouting holes, and to take him the whalers are obliged to keep as close to the pack as possible. Usually they track along the Asiatic side in the Bering Sea and Straits, and as they reach the Arctic, cross over and work up the American shore to the northward and eastward. There is some difference of opinion, however, among whalemen as to the advisability of coasting the eastern side, some believing that it is better to keep up towards Herald Island. In the Bering Sea there is very little danger in entering the ice as it is almost sure to open and offer a chance to escape before reaching the Arctic. With a knowledge of this fact whalers sometimes enter the ice to the southward of the Straits and endeavor to work through it if they have reason to believe from the sudden disappearance of the whale that there is clear water to the northward. In the Arctic, however, the pack is carefully avoided, and it is only when conditions are most favorable that attempts are made to follow up the leads. Point Barrow is approached with the greatest caution, as it is one of the most dangerous places in the Arctic. As has already been mentioned, by far the major portion of the vessels lost in the Arctic are wrecked in its vicinity. Vessels have sometimes been to the eastward of the point as far as the mouth of the Makenzie River, but it is only in the most open seasons and with a prevailing southerly wind that whalemen venture along the northern shore.

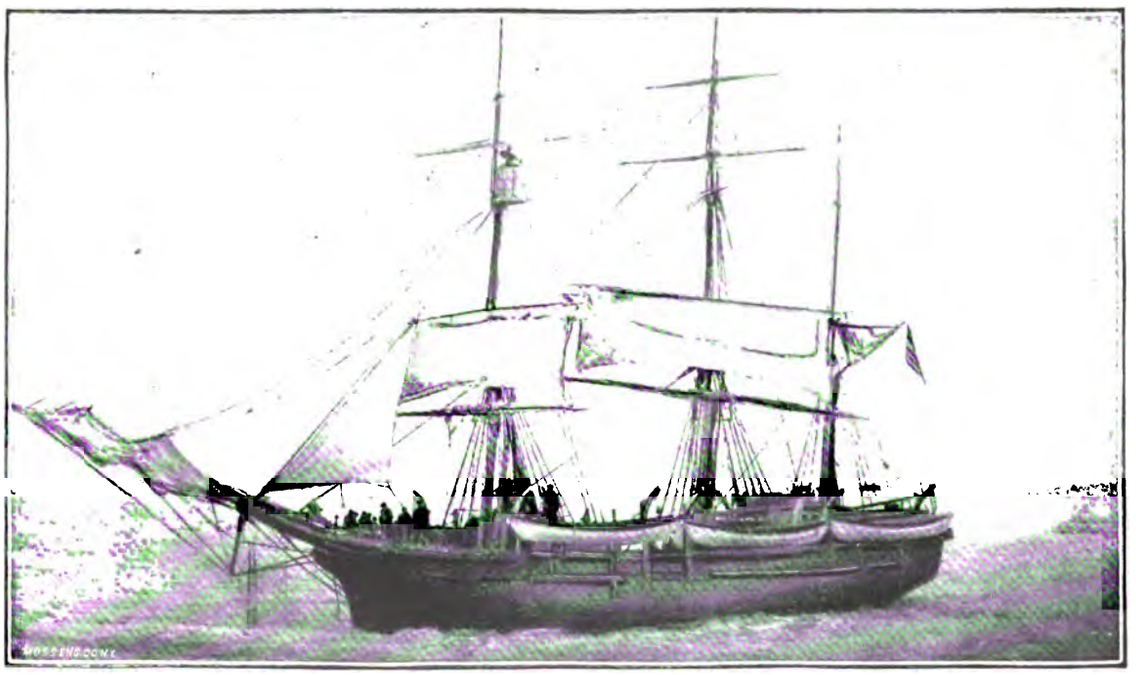
By October 15 it is usual to begin to think of leaving the Arctic. To remain after young ice begins to make is dangerous. Ice begins to form in small globules varying in size from a pea to an egg. These globules cement together, and the sharp crust formed cuts through the planking of a vessel like a knife. The bark *Helen Marr*, Captain Baldey, in 1879, the year memorable for the loss of the *Mt. Wollaston* and *Vigilant*, in working forty-eight hours in this new ice cut through her sheathing and all but one-eighth of an inch of her plank. It is a wonder that she ever reached San Francisco in this condition. As the season advances in the Arctic gale follows gale, and the fury with which they rage seems to increase with each succeeding storm, while maritime dangers rapidly increase. I believe it to be a good rule to leave this stormy ocean with the first bad weather after October 15, and there is no necessity of one of our vessels staying later.

ALASKAN FISHERIES.

The fishing interests of Alaskan America are becoming so important that I feel the Department should become familiar with the details concerning it. In 1876 Mr. J. R. Daggett, a merchant of San Francisco, conceived the idea of fitting out a vessel for the purpose of catching cod in these waters. So successful was the venture that the McCollam Fishing and Trading Company was formed for the purpose of extending operations. Other parties, witnessing the success of the pioneer firm, have fitted out vessels, with generally successful results. Until within the past two years the larger portion of the cod taken have been caught in the vicinity of the Choumagin Islands and in the Okhotsk Sea, but these banks failing somewhat, these gentlemen, with the energy characteristic of American merchants, sought for others more plentiful, and succeeded in finding them in Bering Sea. So little is known of this vast body of water that no definite information can be given in regard to the extent of these banks, but those interested and best acquainted with the



STEAM WHALER MARY AND HELEN.



WHALING BARK BESET BY ICE.

subject are quite enthusiastic, and there is no doubt that in a short time the cod-fishery will be holding its own with the salmon on this coast.

The following letter from the McCollam Company will convey some idea of the extent of the enterprise:

"OFFICE OF MCCOLLAM FISHING AND TRADING COMPANY,
"*San Francisco, October* 21, 1884.

"DEAR SIR: Referring to your inquiry as to the amount of cod fishing carried on in the vicinity of the Alaskan peninsula, we would say, that at our fishing and trading station on Choumagin Islands (Pirate Cove) we have ten men regularly employed; also two small schooners trading and fishing in the vicinity, provisions, gear, salt, etc., going up and fish being carried down on the schooner *Czar* (140 tons), which makes three trips each year between this port and our station. There have also been two schooners belonging to another firm, and carrying about sixteen men each, fishing at the Choumagin Islands this season.

"We had in the Bering Sea the bark *H. W. Almy* (314 tons) fishing on the northern shore of the peninsula. She carries a crew of thirty-five men and has capacity for three hundred tons of cod. These comprise the codfish fleet in Alaskan waters for the season of 1884.

"Of the eleven vessels comprising the Okhotsk Sea fleet, owned by ourselves and others, not one got a full fare this season, while the *H. W. Almy* nearly filled herself in the Bering Sea, besides sending down sixteen thousand fish by the schooner *Czar*.

"We therefore look for an accession to the Bering Sea fleet next year. The Bering Sea is much nearer to this port than the Okhotsk Sea and the fish are of superior quality, but so little is known of the fishing banks that owners have preferred sending to the Okhotsk, which has never failed before, to risking a broken voyage in the comparatively unknown Alaskan waters.

"The codfish found so far have been in spots, and although well-defined banks undoubtedly exist, they have never been prospected as thoroughly as they should be. The coast, too, is so little known that vessels are obliged to proceed with extreme caution, especially during the foggy weather, prevailing a great part of the summer. Should the opportunity present, we would respectfully suggest that soundings be made, with a view of locating shoals and cod-banks in and about the Bering Sea, and suitable harbors and anchorages where vessels might water up in the vicinity.

"There is considerable capital employed in the business at this port and it is steadily increasing. Our company alone employs one hundred and twenty-five fishermen during the season and from forty-five to seventy-five during the greater part of the year at our curing establishment at Pescada Landing, near San Francisco.

"There are two other firms employing nearly as many men, and should new and profitable grounds be discovered nearer than the Asiatic shore the business would be considerably extended.

"In closing permit us to thank you for the information given us which you obtained on your last cruise, and for the use of charts recently made by you.

"Very respectfully, yours,
"THE MCCOLLAM FISHING AND TRADING COMPANY,
"Per C. P. OVERTON, *Secretary*.

"Capt. M. A. HEALY,
"*Commanding U. S. Revenue Steamer Corwin.*"

The following are some of the cod-fishing statistics in Alaskan waters:

Lynde & Hough, Front street, near Pacific:

1883. Schooner *Hancock*, 165 tons.
1884. Schooner *Hancock*, 96,677 fish.
1884. Schooner *Dashing Wave*, 85,000 fish.

The gentlemen state the business to be profitable and intend to continue and increase facilities.

McCollam Fishing and Trading Company:

1884. Fishing station, Pirate Cove, 279,000 fish.
1884. Bark *Helen Almy*, Behring Sea, 202,000 fish.

Anderson & Co.:

1884. Schooner *Isabel*, Behring Sea, 90,000 fish.

OKHOTSK SEA.

John Malloy:
1884. Schooner *Gencoe*, 42,000 fish.
McCollam Fishing and Trading Company:
1884. Schooner *Hera*, 135,000 fish.
1884. Schooner *Tropic Bird*, 82,000 fish.
Lynde & Hough:
1884. Schooner *Arago*, 80,000 fish.
1884. Schooner *Jane A. Falkenberg*, 136,000 fish.
1884. Schooner *Fremont*, 118,000 fish.
N. Bechard:
1884. Schooner *San Luis*, 90,000 fish.
1884. Schooner *Constitution*, 104,000 fish.
1884. Schooner *Francis Alice*, 40,000 fish.
Anderson & Co.:
1884. Schooner *Wm. H. Meyer*, 90,000 fish.

The salmon industry is becoming quite as important in Alaska as on the Oregon and California coasts.

The king salmon taken in northern Alaska are considered as good as, if not finer than the world-renowned Columbia River fish. They are very large, the flesh has a remarkably rich salmon color, and on opening the cans the liquor on the fish is found to be covered with oil, one of the best tests of excellent quality. Generally the salmon of Alaska are very fine, and there seems to be no limit to the supply. That the business is profitable the increased quantity of fish taken each year by the parties engaged in the business, as shown by the following statistics, bears sufficient evidence. (A barrel contains 200 pounds of fish; a case contains four dozen one-pound cans.)

Neville & Co., cannery Beaton Island.—1883, 378 barrels; 1884, 1,500 barrels.

C. C. Rahlfs.—1883, 1,200 barrels; 1884, 2,300 barrels.

Arctic Packing Company, Nushegak, Bristol Bay.—1884, 2,200 barrels.

Sisson, Crocker & Co., Klawack, Prince of Wales Island.—1884, 6,000 cases.

Cutter Packing Company, Kusiloff River, Cook's Inlet.—1882, 6,500 cases; 1883, 1,500 cases 1884, 21,000 cases.

Alaska Commercial Company.—1880, 100 barrels; 1881, 788 barrels; 1882, 1,088 barrels; 1883, 1,459 barrels.

This firm then consolidated with the—

Karluck Packing Company, Karluck, Kodiak Island.—1882, 4,102 cases, 1,493 barrels; 1883, 13,479 cases, 2,672 barrels; 1884, 20,170 cases, 2,081 barrels.

The gentlemen comprising these firms all state that the business is profitable, and that they intend to continue. An aggregate of these amounts shows that there has been taken, in 1884, 8,081 barrels and 47,170 cases of salmon in the waters of Alaska. A business that has reached these proportions I think may well be called an industry.

I have the honor to be, sir, very respectfully, your obedient servant,

M. A. HEALY,
Captain U. S. Revenue Marine.

The SECRETARY OF THE TREASURY,
Washington, D. C.

NATIVE SUMMER VILLAGE, PLOVER BAY, SIBERIA.

NATIVE HUT OR BARRABORA, ALEUTIAN ISLANDS.

REPORT OF LIEUT. J. W. HOWISON.

U. S. REVENUE-MARINE STEAMER CORWIN,
August 21, 1884.

SIR: I have the honor to make the following report concerning my stay at Point Hope, Alaska, while acting in obedience to your orders of July 24, 1884.

Landing at 10.30 a. m. of that date with the dinghy of this vessel and a detail of two men, I camped at a convenient place for boarding such vessels as might arrive in the vicinity and for preventing illicit traffic with the natives.

The following whalers were boarded and examined:

July 25, bark *Abraham Barker*, of New Bedford, Tobey, master, sailed July 26.

August 1, bark *Mabel*, of New Bedford, Cook, master, sailed August 1.

August 3, bark *Arnolda*, of New Bedford, Marvin, master, sailed August 4.

No contraband goods were found on either of these vessels, and although closely watched I detected no attempt at illicit trade.

On July 31 I sounded around the Point and found not less than three fathoms of water until within two ships' lengths from the beach. I found the current about the Point to follow the trend of the land out of Kotzebue Sound and to the northward, and to vary in velocity from one to two knots as the wind was against or with it.

At 6.30 a. m. of August 14 the steam-whaler *Narwhal*, Captain Millard, anchored off the camp and reported the loss of the steamer *Bowhead*, Captain Smith, which had been crushed in the ice near Wainwright Inlet, and had become a total wreck so quickly as not to admit of the saving of stores.

Captain Millard informed me that he had not provisions enough to feed the wrecked men, and that he had come to the Point for the purpose of obtaining the assistance of the *Corwin*. I informed him that I would report the wreck to you immediately upon the arrival of the *Corwin*. He then left for the northward with the intention of leaving some of the wrecked men at the coal mine near Cape Lisburne.

In the two villages at the Point there were but about fifty natives, the rest being away hunting. I could find no traces of liquor in their houses, and I did not see one of them under the influence of liquor. They evidently knew that I was there to prevent liquor being sold to them by whalers and traders, but notwithstanding this my relations with them were pleasant, and I can report them friendly and honest.

On August 20 I rejoined the *Corwin*.

Very respectfully, your obedient servant,

J. W. HOWISON,
Second Lieutenant, U. S. Revenue Marine.

Capt. M. A. HEALY,
Commanding Revenue Steamer Corwin.

ORDERS TO LIEUT. J. E. LUTZ.

U. S. REVENUE-MARINE STEAMER CORWIN,
May 22, 1884.

SIR: Pursuant to Department's order to detail an officer and two men to protect seal-life on Otter Island, you are hereby detailed, with Seamen Joseph Lucas and Thomas Brayil, for that duty.

After landing at St. Paul's Island you will proceed as soon as possible to Otter Island and keep a vigilant lookout during the season that no one is permitted to disturb or take seals from Otter Island and that no unauthorized person or persons be allowed to land either on Otter Island or St. Paul's Island.

You will keep a journal during your stay of wind, weather, etc., and anything worthy of note that may transpire. Gather, also, notes relative to natives on St. Paul's Island, native population, customs, system of education, occupation, etc., and anything regarding the people, seal-life, etc., that you may deem worthy of note.

In case of sickness, either to yourself or men, you will seek medical attendance on St. Paul's Island.

You will leave Otter Island August 20, or as soon thereafter as possible, for St. Paul's Island, and there await the arrival of the *Corwin*.

You will seize or arrest any vessel or person attempting to take seal contrary to law; if persons, hold them in custody until the *Corwin* arrives; if a vessel, seize her, convey her to San Francisco and deliver her to the proper authorities for prosecution, having first obtained necessary evidence.

Very respectfully,

M. A. HEALY,
Captain, U. S. Revenue Marine.

Third Lieut. JOHN E. LUTZ,
U. S. Revenue Marine.

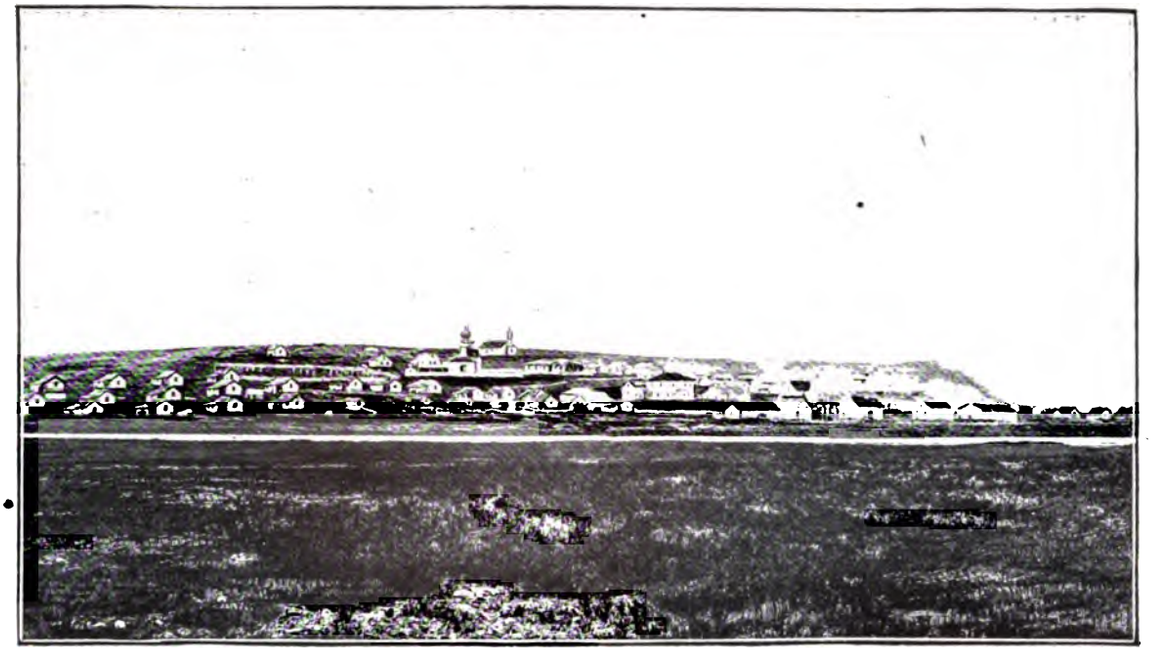
REPORT OF LIEUT. J. E. LUTZ.

U. S. REVENUE-MARINE SCHOONER ADELE,
San Francisco, October 6, 1884.

SIR: I have the honor to submit the following report:

In obedience to your orders of May 22, a copy of which is herewith transmitted, I landed from the *Corwin* at St. Paul's Island June 1.

I found the affairs of this island in an excellent condition. Wholesome sanitary regulations are enforced and unusually good health has prevailed during the past year. All of the natives are now living, rent free, in comfortable frame houses which have been erected by the lessees of the island, in place of the damp and unhealthy "barrabkies" in which these people formerly dwelt. Too much can not be said in commendation of the manner in which the Alaska Commercial Company, the present lessees of the island, fulfilled faithfully all the terms of their contract with the Government. The method of taking seals has been reduced to an admirable system, and every precaution is taken to prevent a diminution of seal life. The natives are treated exceedingly well and none of them are permitted to remain in want of the necessaries of life. They are



ST. PAUL'S, PRIBYLOFF ISLANDS.

FUR SEAL ROOKERY, PRIBYLOFF ISLANDS.

not required to work, although such as desire it are given remunerative employment. By reason of the high price allowed for the labor of skinning seals, these people are able to earn in less than two months a sum amply sufficient to maintain them during the entire year, a sum much larger in fact than the average amount received by laboring men in the United States for a year's work. In addition to this they are supplied free of charge with a quantity of fuel, salt meat, condensed milk, etc., while they have no rent to pay. In religion they adhere firmly to the tenets of the Greek Church. While this church doubtless exercises a good influence over these people spiritually, it drains their pockets systematically to the extent of some thousands of dollars annually, not for the benefit of the church at St. Paul alone, but for the benefit of the church authorities in San Francisco, to whom the major portion is sent. Like all other primitive people, these natives possess an inordinate longing for intoxicating liquors of any description. Fortunately all means of gratifying that desire are now denied them. They are allowed neither sugar nor hops, and can not, therefore, make quass. Gambling is their favorite pastime and is a habit which can not be checked. No bad effects are perceptible, however, as the stakes are usually small. The company retain to the credit of every man a sum sufficient to buy provisions for their families until such time as they can earn more on the seal field, thus preventing the men from squandering all of their money and leaving their families destitute. They would readily invest all of their earnings in jellies, preserves, sweet crackers, silks, etc., but the company will sell them these articles only in limited quantities, encouraging them to buy useful and necessary supplies instead. By precept and example on the part of the Government agents and the employés of the company, these natives are encouraged to lead an upright and industrious life. The welfare of these people and the interests of the Government are well taken care of by Mr. H. A. Glidden, special agent in charge of the seal islands.

Such statistical information as I have been able to collect in regard to the island of St. Paul is set forth in the following tables:

Table showing the number of people on the island of St. Paul at the end of each year, and the number of deaths occurring each year, with the causes of death ascribed.

Year.	Native population.								Number of whites temporary residents.		Total number of people on St. Paul's Island.	Number of births.			Number of deaths.											
	Males.			Females.			Total number of natives.	Number of families.	Males.	Females.		Males.	Females.	Total.	Causes.											Total number.
	Over 18 years of age.	Under 18 years of age and over 5.	Under 5 years of age.	Over 18 years of age.	Under 18 years of age and over 5.	Under 5 years of age.									Pneumonia.	Consumption.	Convulsions.	Scrofula.	Bronchitis.	General debility.	Marasmus.	Inflammation of bowels.	Heart disease.	Cerebral meningitis.	Various causes.	
1872..	67	30	9	65	31	16	218	58	8	2	228	4	6	10	...	2	2	1	....	....	1	....	1	....	3	10
1873..	72	23	6	67	36	13	217	61	6	1	224	2	2	4	....	....	1	10	1	....	....	....	....	....	3	15
1874..	77	22	8	68	36	16	227	79	8	3	238	5	9	14	...	5	....	1	....	....	..	....	....	..	4	10
1875..	83	20	11	73	37	20	244	68	8	3	255	4	8	12	....	...	....	....	2	....	...	...	..	....	7	9
1876..	79	25	16	79	33	22	255	73	5	2	262	10	11	21	1	....	2	....	2	3	...	....	...	...	10	18
1877..	80	23	16	85	30	26	260	80	5	2	267	6	7	13	....	....	....	1	1	....	....	1	....	1	14	18
1878..	75	25	18	86	33	25	262	81	6	.....	268	7	12	19	....	7	...	....	2	....	....	3	...	2	7	21
1879..	82	22	24	86	45	25	284	86	7	1	292	10	9	19	1	1	...	1	2	....	1	...	1	3	8	18
1880..	80	20	18	88	36	37	279	86	7	3	289	9	12	21	2	4	....	1	....	1	....		....	1	11	20
1881..	78	22	25	88	37	35	285	82	7	.....	292	10	10	20	6	3	..	4	....	..	2	..	...	....	2	17
1882..	62	21	18	76	38	21	236	77	10	1	247	8	4	12	5	5	...	...	....	....	....	...	...	....	40	50
1883..	62	20	17	76	44	11	230	71	9	2	241	12	5	17	5	2	...	1	9	....	2	....	..	...	7	26

Table showing the number of arrivals of vessels at the island of St. Paul.

Year.	Description.				Total number of arrivals.	Character.				
	Steamers.	Barks.	Brigs.	Schooners.		Company's vessels.	Government vessels.	Whalers.	Traders.	Yachts.
1872....	6	2	.....	1	9	9	.....	.....	.....	.....
1873....	4	.....	.....	1	5	5	.....	.....	.....	.....
1874....	4	1	.....	3	8	5	2	1	.....	.....
1875....	4	1	.....	1	6	6	.....	.....	.....	.....
1876....	4	1	.....	3	8	6	.....	1	1	.....
1877....	11	1	.....	1	13	6	6	1	.....	.....
1878...	10	1	.....	3	14	11	2	1	.....	.....
1879....	9	.....	.....	4	13	9	3	.....	1	.....
1880....	10	.....	1	2	13	8	3	1	.....	1
1881....	13	.....	1	1	15	9	5	1	.....	.....
1882....	13	.....	1	1	15	9	4	2	.....	.....
1883 ...	12	.....	.....	1	13	10	3	.....	.....	.....
1884....	8	1	1	2	12	8	1	2	1	.....

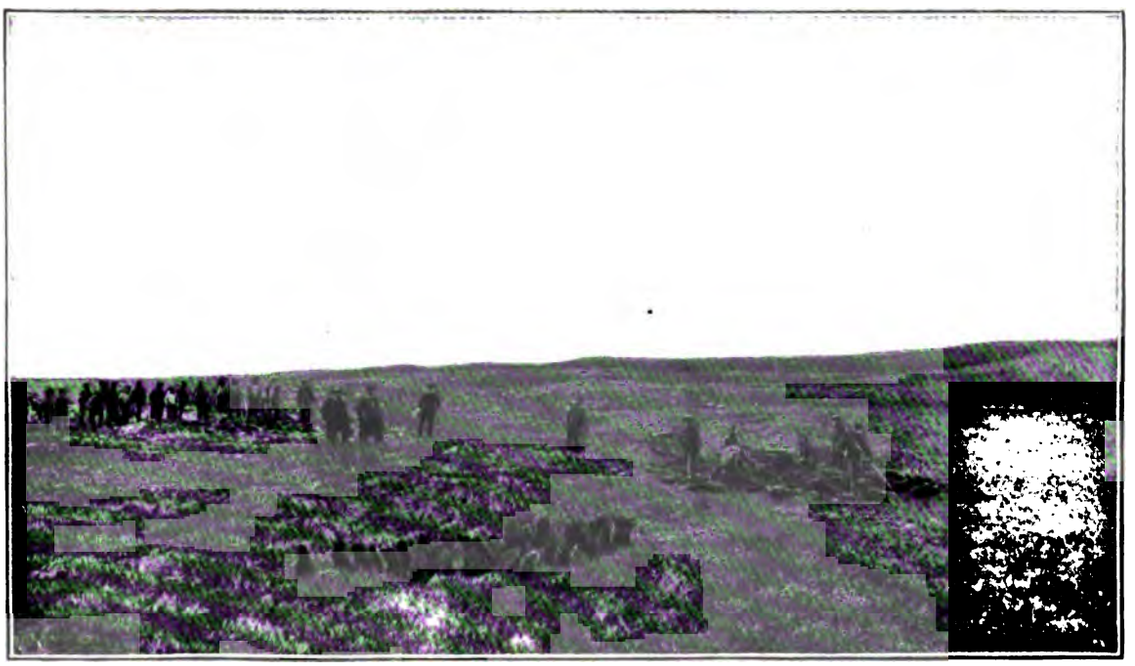
Table showing the number of seals taken on the island of St. Paul, number of sealers employed, time occupied, the amount paid to the sealers, etc.

Year.	Number of seals taken.	Number of sealers employed.	Number of days occupied.	Amount distributed among the sealers.	Amount remaining to credit of natives at beginning of the season.	Value of sealing-tools, stores, etc., imported during the year.
1871....	77,134	70	55	$31,434	.....	$11,855
1872....	76,040	74	50	30,638	.....	18,085
1873....	75,437	74	40	29,675	.....	29,599
1874....	74,924	76	39	30,067	.....	39,555
1875....	75,699	78	35	30,374	.....	28,620
1876....	80,000	88	33	31,961	$7,625	32,649
1877....	60,199	80	29	24,128	11,860	24,746
1878 ..	82,000	77	33	32,849	15,482	44,391
1879 ..	80,000	78	33	32,153	17,957	42,109
1880....	80,000	84	34	32,104	20,668	49,050
1881....	79,905	76	35	31,879	27,325	49,713
1882 ..	80,000	67	37	32,008	20,766	52,188
1883....	60,000	64	36	23,994	20,465	43,000
1884....	85,000	63	38	32,026	20,213	39,121

I am unable to give the increase or decrease of population that may be caused by immigration or emigration, but it may be deduced, approximately, from the first of the tables here given. At least one interesting fact is shown by this table, namely: That while a given number of deaths occurring during a given year is about equal to the number of births recorded during the same time, an epidemic visits these people at intervals and carries off a number who are never replaced, proving conclusively that the race is on the decrease.

By the table on the preceding page it will be observed that there is a gradual decrease in the number of days required for making the catch, which goes to prove an increase in the seal-life on this island. The catch for this season was completed on the 21st of July, and although unusual care had been exercised in the selection of the animals, in order to secure the highest grade of skins, the whole work was done in the shortest space of time, considering the number of seals taken and the men employed. The natives of St. Paul are required to drive the seals up from the beaches and perform the operation of skinning after the animals have been killed. All other labor is performed by men from Ounalaská and other places, who are taken to St. Paul for that purpose. The sealers are paid a sum equal to forty cents for every skin taken, and are divided according to their experience and proficiency into five classes. Those belonging to the second, third, fourth, and fifth classes receive, respectively, nine-tenths, eight-tenths, seven-tenths, and five-tenths of a first-class share.

FUR SEALS, SAINT PAUL'S ISLAND.



SEAL-KILLING GROUNDS, PRIBYLOFF ISLANDS.

On the 10th of June I went to Otter Island in compliance with your instructions, for the purpose of protecting that place from marauders.

While there I made a collection of specimens for the Smithsonian Institution, in obedience to your verbal orders. The collection, which is marked "Coll. J. E. L., U. S. S. *Corwin*," is herewith transmitted. The following is a list of the specimens, corresponding to the numbers they bear:

No. 1. Nest and set of five eggs of Gray-eared Finch (*Leucosticte tephrocotis* var. *griseinuche*), taken June 16.

No. 2. Nest and set of five eggs of Snow Bunting (*Plectrophanes nivalis*), June 15.

No. 3. Eggs of Pacific Kittiwake (*Larus tridactylus* var. *Kotzebui*), June 21.

No. 4. Egg of Short-billed Kittiwake (*Larus brevirostris*), June 29.

No. 5. Three eggs of Red-faced Cormorant (*Glaculus bicristatus*), August 5.

No. 6. Egg and nest of Horned Puffin (*Fratercula corniculata*), June 19.

Nos. 7 and 8. Eggs of same, June 20.

No. 9. Egg of same, June 24.

No. 10. Egg of same, June 26.

No. 11. Egg of same, July 30.

No. 12. Egg of Tufted Puffin (*Fratercula cirrhata*), June 24.

No. 13. Egg of same, June 27.

No. 14. Egg of Parroquet Auk (*Phaleris psittacula*), June 20.

No. 15. Egg of same, June 23.

No. 16. Egg of Crested Auk (*Simorhynchus cristatellus*), June 20.

No. 17. Egg of same, June 20.

No. 18. Egg of same, June 22.

No. 19. Egg of Knob-billed Auk (*S. pusillus*), June 14.

No. 20. Egg of same, June 14.

No. 21. Egg of same, June 17.

No. 22. Egg of Murre Giullemot (*Lomvia troile*), June 13.

No. 23. Egg of same, June 18.

No. 24. Egg of Thick billed Giullemot (*Lomvia arra*), June 13.

No. 25. Egg of same, June 13.

No. 26. Egg of same, June 30.

No. 27. Chick of Parroquet Auk (*Phaleris psittacula*).

Nos. 28 and 29. Chicks of same.

No. 30. Chicks of Crested Auk (*Simorhynchus cristatellus.*)

Nos. 31, 32, and 33. Chicks of same.

Although Otter Island is visited by myriads of birds, the number of species is very small, embracing not more than twenty-five, which includes migratory flocks and stragglers. It is an excellent place for studying the habits of such birds as breed there, and any question in regard to them could be satisfactorily answered by observation.

Some of the eggs in this collection are rare among naturalists, by reason of the inaccessible nature of the nests. More of the same kind could be obtained in that place by any one possessed of a little experience in scaling the face of cliffs and a knowledge of the habits of the birds found there. I secured a number of chicks of *Frater corniculata* and *F. cirrhata*, as well as of the *Phaleris psittacula* and *Simorhynchus cristatellus*, but, with the exception of the accompanying specimens, all spoiled for want of proper facilities for drying the skins. These are exceedingly rare, probably altogether unknown.

All of the birds which came under my observation were remarkably persevering in their efforts to propagate their species, and all would lay fresh eggs to replace those which had been removed. In July I removed from the nest of a gray-eared finch the half-fledged young brood. The mother laid five eggs within a week, and I then removed them, as well as the nest. Thereupon she built a new nest and deposited two more sets of eggs. Not until the last was taken away did she desert the place. The guillemot's eggs were to be found on outlying rocks as early as June 10, and were replaced as fast as removed until the first of August. Even that shy bird, the horned puffin, would lay a second egg upon the first being abstracted, and when the female

was removed, the male attempted to finish the process of incubation. No nest is made by these birds, as a usual thing, but a small quantity of dry grass or feathers is placed on the rock, evidently for the purpose of protecting their plumage from the mould and moisture. From the nest of a cormorant I removed two full-grown birds, to all appearances the parents of the brood of chicks, and I afterwards observed two other adult birds feeding the chicks and taking a parents' care of them. The kittiwakes, in many cases, laid but one egg each; sometimes two, and a set of three eggs was extremely rare, according to my observation.

These few facts I give as ones which may possibly be unknown to naturalists. Prof. H. W. Elliott, of the Smithsonian Institution, has so faithfully studied the ornithology of these islands that little remains to be told in regard to the habits of the birds there found.

The result of soundings which I made in the vicinity of Otter Island is shown on the accompanying chart. Several dangerous shoals and rocks, hitherto unknown, are to be observed there.

The journal which I kept during my stay on the islands is herewith respectfully submitted for your approval.

A comparatively small number of seals visited Otter Island this season. The animals which go there are evidently stragglers from St. Paul, and the frequency and length of their visits appear to be governed by the weather. While the necessity of this detail for the protection of Otter Island and St. Paul Island is self-evident, I would respectfully suggest that the officer sent there could perform that duty better if stationed on the latter island instead of the former. He should, of course, be instructed to visit Otter Island whenever practicable, as well as the more remote portions of St. Paul Island, in order to observe any possible depredations. Marauders are not so likely to attempt to take seals from Otter Island, which is so well protected by rocks and heavy surf, as they are to visit the northern part of St. Paul Island, where a fine sandy beach extends for miles on either side of the island, and seals are to be found in great abundance. With the small boat provided for use on Otter Island, and a crew of only two men, it would be impossible, usually, to board and seize any vessel which might be detected in the attempt to kill seals. I would respectfully urge the necessity of having a small boat howitzer provided for the officer detailed for duty at that place. With that and a large boat and crew which the Alaska Commercial Company would willingly furnish whenever desired, one officer stationed on the island of St. Paul could protect it and the adjacent waters from the depredations of marauding vessels, and would also be able to take by force any vessel found violating the law.

On the 6th of July I saw a bark to the westward. She stood inshore until within five miles of Otter Island, then ran offshore again. The next morning she came in sight once more, standing in from the westward. When about five miles west northwest of Otter Island she hove to and lowered a boat. Considering her movements unaccountable, if not suspicious, I immediately went out and boarded the vessel. I found her to be the bark *Coral*, Kelley master, from San Francisco, on a whaling cruise. An examination of the vessel disclosed no violation of law, and the master explained that he was in search of medical assistance, and, being unacquainted with those waters, did not wish to approach too close to land. He sent the sick man ashore at St. Paul and proceeded to sea that afternoon.

No other strange vessel was seen until the 3d of August, when I observed a small schooner about twenty miles to the eastward, steering in a southwesterly direction. On the 8th, and again on the 10th, a schooner, to all appearances the same one, came in sight from the southwest and was observed to be heading directly for Otter Island until lost to view in the fog which shut in shortly afterward.

On the 20th of August I left Otter Island and went to St. Paul to await the *Corwin's* arrival. All of the seals had left the former island and no more vessels had been seen.

Another schooner appeared southwest of St. Paul on the morning of the 29th, and was in sight during the forenoon.

On the afternoon of the following day another schooner came in sight from the southwest and stood up the west side of the island. From the movements of the last vessel I inferred that she would attempt to take seals on the northern part of St. Paul Island. Therefore I secured the services of six natives, and with them, my two men, and a volunteer in the person of one of the employés of the Alaska Commercial Company, immediately set out for Northeast Point in a large

SHOOTING SEAL ON A GROUNDED BERG, ARCTIC OCEAN.

whale-boat furnished by the company. Upon reaching Northeast Point, at 10 p. m., I learned from the native watchman stationed there that the schooner had kept on to the northward. We kept watch during the night, however, but did not see the vessel until daylight, when she was discovered about twenty miles off-shore, lying to. This showed that her people had a fixed purpose, which could be no other than an intention to attempt a landing for the purpose of capturing seals, and I watched the vessel closely. She was in sight until noon, when thick fog set in, obscuring the view. A fresh westerly gale prevailed during that time. Late in the afternoon the wind moderated and the weather cleared, but the schooner was not to be seen. We kept a bright lookout that night also, and at 12.30 a. m. (September 1) discovered the schooner sailing down the eastern side of the island, about a mile off-shore. I immediately called up the crew, launched the boat, and set out in pursuit. After a pull of a mile and a half, I reached the vessel at 1 a. m. She was then anchored close inshore. I boarded her with my men and found the master of the vessel on board. Upon being questioned, he freely admitted that he was there for the purpose of sealing, and that his boats had been sent ashore to make a catch. I then waited for the return of the boats. The master meanwhile pleaded to be released, making various excuses, and saying that I would "lose nothing" if I would let the vessel go. In a short time the three boats belonging to the vessel came back loaded with seal carcasses. Having now secured all necessary evidence, I notified the captain of the seizure of the vessel. It was not without trouble that I succeeded in overcoming a manifest disposition to resist the seizure. I had now six white men to contend with, and some of them were outspoken in their determination not to be arrested. They were beginning to arouse a spirit of resistance in the captain also, when I called him aside, formally notified him that I seized his vessel in behalf of the Government of the United States, warned him against resistance, and demanded the vessel's papers. He immediately surrendered them, and the other men then resigned themselves to their fate. There was an occasional outbreak on the part of one or the other of the more turbulent ones, but nothing serious occurred from first to last.

By the schooner's papers she was shown to be the *Adele*, of Hamburg, Gustave Isaacson, master, with three officers and a crew of eighteen Japanese. In addition to the four white men belonging to the vessel, I found on board two others whose presence was not accounted for except by a verbal statement from the captain that they were passengers. They were ashore with the others killing seals at the time I boarded the vessel. One of the passengers, Sullivan by name, was more disposed to resist arrest than any of the others, saying that all he possessed "was in the vessel." The *Adele*, as exhibited by her papers, was built at Shanghai in 1877, and measures "fifty British tons." She sailed from Yokohama April 9 last, having cleared for a hunting voyage to the North Pacific, the Kurile Islands, and return. She was therefore out of the waters for which she cleared, in addition to which she had no name painted on the stern.

Many of the seals brought off by the boats were thrown overboard in the attempt to get away, but I secured twenty-one, and afterwards had the skins removed and salted. The vessel contained, besides, two hundred and seventeen seal-skins, ten sea-otter skins, eighteen sea-lion skins (poor), thirteen fox-skins, forty-two sacks of salt, forty-two mats of salt, and thirty-eight mats of rice.

After daylight we got the vessel under way and proceeded to the village. The master and officers of the vessel refused to have anything more to do with her management, and it therefore became necessary to detain them as prisoners. As I could not hope to keep six well-armed men under restraint with my small force, and as the vessel did not afford any safe place for confinement, I deemed it necessary to send them ashore to be kept there until your arrival. The agent of the company generously offered to provide quarters and food for them as prisoners, and the special agent kindly volunteered to assume charge of them. The crew then refused duty. I detained five of them on board and sent the remainder ashore.

Soon after our arrival at the village, word was received by telephone from Northeast Point that a schooner was there engaged in the capture of seals, and that another vessel was approaching from the northward. It was necessary to drive off these marauders as soon as possible, so I procured a fresh crew of natives and started forthwith. As the *Adele* could not be left with safety, owing to the want of any harbor, I considered it advisable to use her for the purpose of giving chase to the others.

Upon reaching Northeast Point I saw one schooner lying at anchor, about six miles off-shore,

her people being then engaged probably in skinning the seals taken from the beach. As soon as I stood off in her direction she got under way for the northward. Then she stood off and on, making signals by dipping the peak of her mainsail, from which, as well as from a chance remark made by one of the officers of the *Adele*, I inferred that these vessels had been acting in concert. Finally she hove to when nine or ten miles off-shore and waited for me. It was dusk when I drew near her and her people could not distinguish the revenue flag until I was within one hundred yards of her. I then observed that the vessel's name had been painted out. She immediately filled away and made all sail. My hail was answered by her people, who refused to give the schooner's name, and no attention was paid to the order to heave-to until boarded. I caused two shots to be fired across her bow and two into the upper part of her rigging, hailing her people after every shot and repeating the order for them to heave-to. Muttered imprecations were the only reply until after the fourth shot, when they fired into us. I then directed my men to aim lower, so as to rake the decks of the other vessel. I stopped the fire at intervals to see if she would heave-to. She fired five or six shots into us, which we returned with fifty or sixty rounds. We suffered no damage, and they probably received little or no injury, as they were all under cover. Darkness had set in, the wind freshened, and I finally abandoned the chase. I saw no hope of being able to take the vessel with my small force, or at least of doing it without endangering the one already captured.

I reached the village on the following morning, September 2, and made preparations for the voyage to San Francisco. A small supply of stores was needed, as the vessel was poorly supplied, and many of such articles as were on board had been rendered worthless by dampness. I procured such things as were absolutely necessary, and I respectfully request that bills for the same, when submitted by the Alaska Commercial Company, be approved by you and forwarded to the Department, with an application to have them allowed and ordered to be paid.

Having found that in order to work the vessel safely more men would be required, I persuaded four more of the Japanese to come on board and turn to, representing that such a course was the only one by which they could hope to get their pay. They had all shipped for a voyage of seven months from April 7, at from seven to thirteen dollars per month, receiving two months' wages in advance. As soon as the last-named four members of the crew arrived on board the whole company held a consultation, and then gave me to understand that as the vessel was short-handed they would not go with her unless they were promised higher wages. As I could not guaranty that, I told them they could go ashore and forfeit all claim for wages already earned. It seemed likely that I should be obliged to commence the voyage without a crew. At last they agreed to remain on board, and they have served faithfully and well.

Three vessels were reported in sight that day, but as the authorities had now been given sufficient time for equipping and sending out armed parties to protect different portions of the island, I considered it unnecessary for me to remain.

At midnight I got under way and proceeded towards Ounalaska. The rudder was loose in the pintles, and was not therefore in a safe condition, for which reason I desired to put into the nearest harbor to effect the necessary repairs. I was prevented from doing so, however, by continued thick weather and alternate gales and calms. It was impossible for me to find the way into the harbor unless able to see the land, as I had no reliable chart and no record of the error or rate of the chronometer. After a delay of five or six days I gave up the attempt, worked to the eastward, cleared Ounimak Pass September 12, and thence had a prosperous passage to this port, arriving at 2 p. m. September 28.

Upon reaching here I transmitted a telegram to the Department, reporting the seizure of the vessel and arrival here. On the 29th I received the following reply:

"WASHINGTON, D. C., *September* 29, 1884.

"Lieut. JOHN E. LUTZ, *U. S. R. M.*,
"*Care Custom-House, S. F., Cal.:*

"Turn over schooner *Adele* to United States marshal. Consult United States district attorney, San Francisco.

"W. Q. GRESHAM,
"*Secretary.*"

FUR SEALS, SAINT GEORGE'S ISLAND.

The United States marshal refused to receive the vessel, stating that he could not do so before a libel had been filed against the vessel and a writ issued by the court authorizing him to take possession. I then placed the case in the hands of the United States district attorney for prosecution. Owing to a press of other business, however, the libel has not been filed as yet; therefore I retain charge of the vessel. Upon information given by me the United States commissioner to-day issued a warrant for the arrest of the six white men formerly belonging to the *Adele*, and the United States marshal took them into custody. The district attorney authorized the release of the nine Japanese whom you brought from St. Paul, but will retain as witnesses those now on board of the schooner.

It is to be hoped that this case will be vigorously prosecuted. The case is a remarkably clear one, and the most impartial observer can detect no extenuating circumstances. An opportunity is now given to make such an example as would tend to check future depredations of this nature, while, on the other hand, if these parties were allowed to go free, the act would be equivalent to declaring null and void that law which now protects the Government's valuable interests in the seal fisheries.

I remain, sir, very respectfully, your obedient servant,

JOHN E. LUTZ,
Third Lieutenant, U. S. Revenue Marine.

Capt. M. A. HEALY,
Commanding Revenue Steamer Corwin.

DESCRIPTIONS OF BOGOSLOV ISLAND

AND THE

NEW VOLCANO IN BERING SEA,

(ILLUSTRATED WITH SIX PHOTOGRAPHS).

BY

LIEUT. J. C. CANTWELL and SURGEON H. W. YEMANS.

BOGASLOFF: SAIL ROCK, BEARING NE. BY E., DISTANT ONE MILE.

SAIL ROCK AND NEW BOGASLOFF.

DESCRIPTIONS OF

BOGOSLOV ISLAND AND THE NEW VOLCANO IN BERING SEA.

Visited by the U. S. S. Corwin, Capt. M. A. Healy, U. S. Revenue Marine, commanding.

REPORT OF SECOND LIEUT. JOHN C. CANTWELL.

Approaching the island from the northeast it has the appearance of being divided into two parts, the northern portion being in a state of eruption and the southern portion a much serrated rock rising almost perpendicularly from the sea, while between the two and nearer the northern part of the new Bogoslov a tower-like rock rises with a slight inclination towards the north to a height of eighty-six feet. At a distance it might be easily mistaken for a sail upon the horizon; for this reason it is called Ship Rock or Sail Rock. A nearer approach discovers the fact that the two elevations are connected by a low, flat beach free from rocks and affording an excellent landing place for small boats. The *Corwin* steamed around the northern end of the island and close enough to obtain an accurate view of the volcano. The top was hidden by clouds of steam and smoke which issued not only from the crater but also poured forth with great violence from rents or areas in the sides of the cone. On the northeast side these apertures are particularly well defined. I counted fifteen steam jets forming a group situated on a horizontal line about two-thirds the distance from the base to the apex of the cone. This group was the more noticeable on account of the force with which the steam escaped as well as the marked regularity of the spaces separating the vents. The sketch marked A gives a view of the northern end of the island and the position of steam jets mentioned above.

When the center of the island bore northeast and distant three-quarters of a mile the *Corwin* was anchored in thirteen fathoms water and a boat lowered in which we proceeded towards the shore, sounding in from ten to twelve fathoms until within one hundred and fifty feet of the beach, when the water gradually shoaled and we landed without difficulty, the wind being light from northeast and the sea smooth. The landing place is shown in the sketch marked B.

The narrow isthmus connecting the old and new formations is composed of a mixture of fine black sand and small oolitic stone, the greatest quantity of sand being on a line dividing the island longitudinally into two parts. During our stay the water did not rise high enough to cover this beach, but pieces of drift-wood, algæ, etc., found on the highest parts fully show that at the times of highest tides or during severe storms the entire isthmus is submerged.

The sides of the new Bogoslov rise with a gentle slope to the crater, and the ascent at first appearance is easy, but the thin layer of ash formed into a crust by the action of rain and moisture is not strong enough to sustain a man's weight. At every step my feet crushed through the outer covering and I sunk at first ankle-deep and later on knee-deep into a soft, almost impalpable dust which arose in clouds and nearly suffocated me. As the summit was reached the heat of the ashes became almost unbearable, and I was forced to continue the ascent by picking my way over rocks and bowlders whose surfaces being exposed to the air were cooler and afforded a more secure foothold.

The temperature of the air at the base was 44° and at the highest point reached 60°. A thermometer buried in the sand at the foot of the cone registered 44°, half-way to the top, 191°, and in a crevice of the ramparts of the crater the mercury rapidly expanded and filled the tube, when the bulb burst, and shortly afterwards the solder used in attaching the suspension ring to the instrument was fused. We estimated the temperature at this point to be 500° Fahrenheit. The temperature of the water around the island was the same as that of the sea, as observed on board the *Corwin* at the time, was 40°.

On all sides of the cone there are perforations through which the steam escaped with more or less energy. I observed from some vents the steam was emitted at regular intervals, while from others it issued with no perceptible intermission. Around each vent there was formed a thick deposit of sulphur, the vapor arising from which was suffocating and nauseating in the extreme.

An examination of the interior of the crater was not satisfactory on account of the clouds of smoke and steam arising and obscuring the view. On the northwest side the surface of the cone is broken into a thousand irregularities by masses of volcanic and metamorphic rock. On all other sides, however, the accumulation of ash and dust has almost entirely covered the rocks and the sides appear more even and less precipitous.

A curious fact to be noted in regard to this volcano is the entire absence, apparently, of lava and cinder. Nowhere could I find the slightest evidence of either of these characteristics of other volcanoes hitherto examined in the Aleutian Islands. Small quantities of rock-froth consisting of unfused particles in a semi-fused mass were seen, but the heat of discharge has evidently never been sufficient to produce firm fusion. Specimens of dust collected from one of the vents was compared with volcanic dust which fell in the village of Ounalaska October 20, 1883, and found to be identical in character.

Descending to the beach on the east side I found it to be much the same formation as on the west side, with perhaps the exception that the line of sand here approaches nearer the water-line. The pebbles seen on the island are universally of a dark-gray color, with small black spots and worn surface by attrition.

I saw no shells and but little sea-weed. Kelp in considerable quantities, however, was observed close inshore.

A walk of a third of a mile brought me to old Bogoslov, where the beach abruptly terminates. The northern end of this rock rises almost perpendicularly to a distance of some 325 feet. Its face is deeply indented at the base, forming a cave-like recess which gives the rock the appearance of leaning toward the north.

Probably nowhere can there be found a better example of the disintegration of stone into soil by the action of the atmosphere. The composition of the islet was originally of slate or shale. It is now breaking down on all sides and crumbling to dust. The central portion seemed to be composed of a more enduring substance, but a close examination was impossible on account of the loose, crumbling nature of the rock forming the sides and the precipitous ascent. I fired a rifle-shot into a flock of puffin, myriads of which were perched in the clefts and niches of the rock, and when they rose small pieces of stone were detached and in turn displaced larger pieces of stone until a perfect avalanche of stone came down the declivity, scoring great ruts in the hillside and tearing up great masses of stone, which were dashed to pieces on the shore below.

Specimens of outer rock were found at the base of the old Bogoslov, on the southern side, which, being struck with a hammer, crumbled to dust, in some cases deeply tinted with red, showing the presence of iron.

Hard bowlders of some hard, smooth stone fringe the bases of both the old and new Bogosloff, but a careful examination of the surrounding waters, both in small boats and on board the *Corwin*, failed to show any outlying dangers. A spot of sand and pebble formation extends from the southern end of old Bogoslov four-tenths of a mile in a southeasterly direction, and, like the isthmus connecting the two islands, is probably submerged at times of highest tides or during severe storms. The depth of water around the island is shown upon the chart accompanying the report.

Puffin in great numbers were seen on old Bogoslov, and it is probable they make this isolated spot a breeding place. I also saw numbers of harlequin-ducks, gulls, and kittiwakes. A dead albatross was picked up on the beach, but it is probable it was washed ashore, as its presence in

OLD BOGASLOFF, BEARING E. BY N.

EAST FLANK OF CRATER.

No earthquake shocks or other unusual phenomena were noticed on the neighboring islands at the time of the supposed eruption, though the two volcanoes on Akoutan Island ceased to smoke at about that time and have shown no signs of activity since.

October 20, 1883, a shower of volcanic ashes fell at Ounalaska, sixty miles to the eastward, although it is possible that this pumice dust came from Mount St. Augustine, a volcano then active some seven hundred miles northeast of that place.

May 21, 1884, at 4 a. m., the new formation was seen from the deck of the *Corwin*, as a dull gray, irregularly shaped hill of about five hundred feet in height, from the sides and summit of which great volumes of steam were arising, obscuring the upper third, and becoming detached, floated off on the northwest wind, then blowing, as cumulous clouds. At a height of about two-thirds of the distance from the base there issued, on the north side, a series of large steam jets, which extended in a horizontal direction completely across the northwestern face of the hill, which at that part was considerably flattened laterally and quite steep, giving it a very striking resemblance to a smoking charcoal kiln. This is shown in a photograph, somewhat blurred, unfortunately, owing to a sudden lurch of the ship.

Fortunately, the day was clear, not hazy, although the sky was overcast, a somewhat thick layer of cumulo-stratus clouds obscuring the hill most of the time, rendering the process of picture-taking a difficult undertaking, and our artist, Lieut. George H. Doty, is to be congratulated on his (under the circumstances) brilliant success. Without the accompanying photographs an adequate description of this recent and most interesting addition to the Aleutian group of islands could hardly be given, while with them one can avoid creating false impressions, and can also remove erroneous conceptions.

On nearer approach what at first sight appeared to be patches of vegetation became visible. A closer examination, however, revealed their true nature—collections of condensed sulphur which had accumulated around the orifices of what had once been active steam jets. These condensations were still going on, each vent, in fact, having its encircling collection of condensed sulphur of various hues and tints.

Steaming to within one-fourth of a mile of the south side of the isthmus, which was first discovered to form a connecting link between the old and new portions of Bogoslov, thus making them one, so to speak, the *Corwin* was brought to an anchor in thirteen fathoms of water, and a landing by boats was immediately made. But little surf was breaking on the beach, which at that point was composed of fine gravel and sand, and landing thereon presented no difficulties.

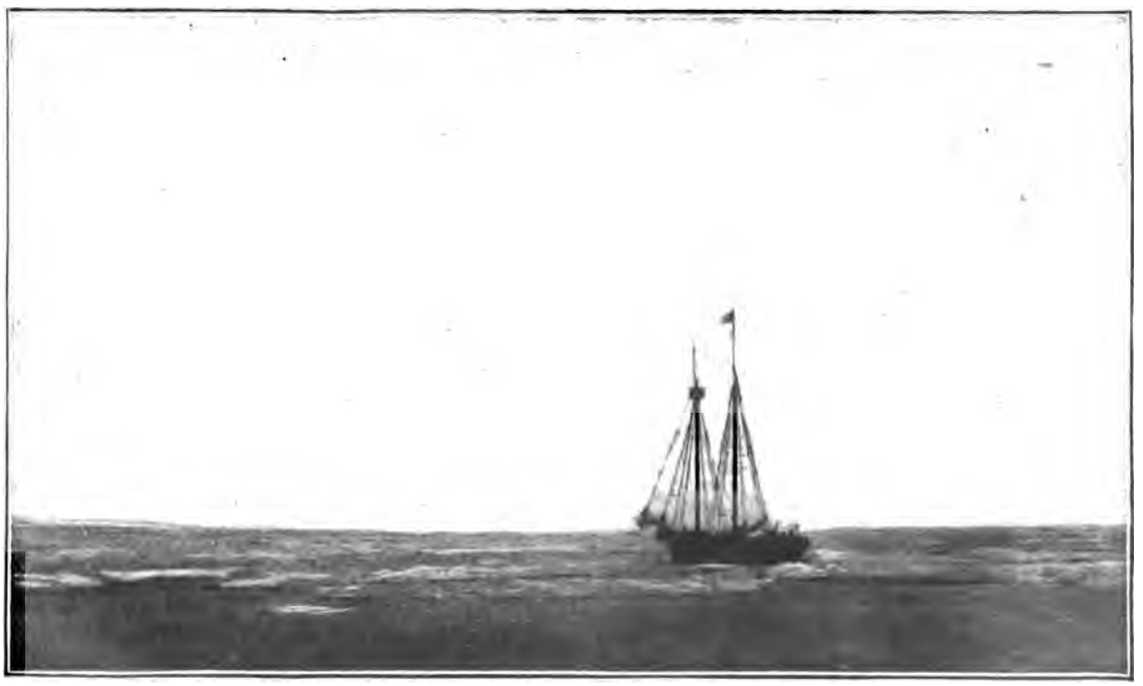
Photograph No. 2 was taken from the ship, at a distance of three miles off Ship Rock, which then bore NE. ¾ N., and shows distinctly the exact relation of the old and new portion of the island, including also the isthmus, near the middle of which stands the rocky pinnacle known as Ship Rock.

The low, narrow intermediate portion of the island termed in this report the isthmus, lying between and connecting the higher extremes, is readily seen to be of much greater age than the newly formed portion, and had evidently been, previous to the recent eruption, a partially submerged spit, making out in a northwesterly direction from old Bogoslov; but the same force which pushed up the new addition elevated it also, especially that portion, the extremity immediately beneath the northeastern half of the new formation. The extent of this elevation, judging from the barnacles and water-marks on Ship and other rocks, being some twenty or more feet. It is the extremity of this spit which forms a considerable part of the foundation of the new portion.

But few shells were found on the beach, and the only vegetation seen was a few patches of kelp and some specimens of Fucacine thrown upon the beach. Myriads of sea fowls occupied the clefts and crevices of the rocky heights of old Bogoslov and on the beach and rocks surrounding that end of the island. Large numbers of sea-lions, some of immense size, were seen, but took to the water on our approach. Both birds and animals seemed to avoid the newer portion, on which I saw no animal life whatever.

The temperature of the water at the place of landing was the same as that more distant from the island, 42°; of the atmosphere, 44°; and a thermometer buried in the gravel of the beach above high-water mark registered 44°. Already had the odor of sulphurous oxide become distinctly perceptible, which near the summit and in the depressions rendered respiration decidedly difficult.

WHALING STATION NEAR POINT BARROW. FORMERLY SIGNAL STATION, U. S. A.



ARCTIC OCEAN TRADING SCHOONER.

Following the beach to the southward, in order to get as far to windward as possible, until a point opposite the ridge shown in the left of photograph numbered 4 was reached, the ascent was begun. For the first one hundred yards the route lay over a gentle slope composed of fragments of rock thickly covered with loose ashes, into which one sank knee-deep at every step; then, as the sides became steeper, over loosely-piled fragments of rock, following the ridge until about two-thirds of the distance had been accomplished, when we were confronted by an insurmountable wall of rock (aqueo-igneous conglomerate), which stopped further progress in that direction. At this point an attempt to photograph the interior of the great fissure was made, but the immense volume of aqueous vapor issuing from it and the numerous vents in the vicinity so completely obscured the view as to render it a total failure. Photographs Nos. 3, 4, and 5 give a sufficiently clear idea of the appearance of the new formation to make the following brief description intelligible. The great fissure extends in a northeast and southwest direction through the upper third of the hill, dividing it into two unequal portions, the southeastern part being much the smaller and lower one. The smaller portion is about one-fifth of the mass and was 403 feet in height. Owing to its top being obscured the height of the larger summit could not be definitely ascertained, but it was probably about seventy-five feet higher than its neighbor, certainly not over five hundred feet in all, which height it had probably never exceeded by more than fifty feet. No satisfactory examination of the interior of the great fissure could be made, owing to the steam, fumes, and heat rendering entrance into it highly dangerous if not absolutely impossible.

The immediate entrance only was visible, the clouds of vapor which arose from and almost completely filled it hiding the interior from view. Vents more or less active were abundant; the temperature of the interior of one of the smaller ones was 196°; the thermometer, laid on the surface in a sheltered situation, registered 56°, while when held at the height of the head from the surface the mercury fell to 49°. Water thrown upon the rocks at the entrance of the great fissure was immediately vaporized with a hissing noise. It was observed there and elsewhere that the discharge from the vents was perfectly regular, unaccompanied by much, if any, noise, and the ear placed upon the surface and over the larger of the extinct vents could detect nothing more than a faint "purring" or hissing sound.

Finding it impossible to make the wished-for examination of the great fissure or to reach the summit, we descended and made a half circuit of the base, where a re-ascent was attempted. Steep and inaccessible walls soon stopped our progress, however, and only about the same elevation as on the opposite side was reached, and similar success attended our efforts to penetrate or even obtain a view of the interior. The heat of this side was much greater than that of the other, both of the surface and the discharges, it being hot enough in one of the crevices through which steam was escaping to quickly melt the solder fastenings of the thermometer and expanding the mercury sufficiently to burst the bulb, although the instrument was made to register 260° F.

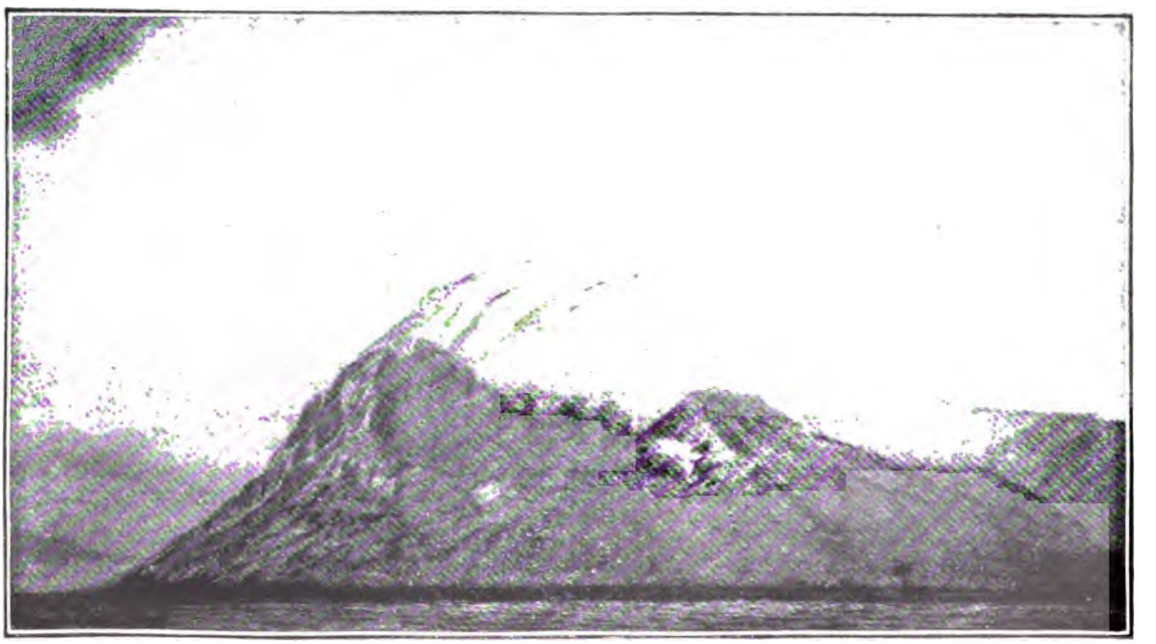
It is much to be regretted that a thorough examination of the interior of the great fissure was rendered impossible, as much desirable information could doubtless have been obtained, for at its bottom would, in my opinion, be found the perpendicular stratum forced up at the time of eruption, elevating the softer strata into the two flanking ridges which form the apices of the larger and smaller elevations surmounting the hill. A few fragments of granitoid rock picked from among the débris indicate the probable character of this intermediate stratum, no outcroppings of which were, however, visible. The flanking portions, indeed, almost the entire visible part of the new formation, had evidently once formed the bottom perpendicular stratum, of which latter Ship Rock is possibly an extension or more probably a forerunner. Photographs Nos. 6 and 7 show, respectively, the northwest end and southeast side of old Bogoslov.

Upon the return of the *Corwin* from the Arctic next fall it is hoped an opportunity to revisit this interesting spot, the scene of one of nature's curious freaks, will be afforded, so that a more thorough examination may be made and changes noted.

Respectfully submitted.

H. W. YEMANS,
Assistant Surgeon, U. S. Marine-Hospital Service.

OLD BOGASLOFF, FROM SAIL ROCK.



NEW BOGASLOFF, BEARING SE.

ON HORNBLENDE ANDESITES FROM THE NEW VOLCANO ON BOGOSLOV ISLAND IN BERING SEA.

BY GEORGE P. MERRILL.

The rocks described below were received from Capt. M. A. Healy, by whom they were collected and donated to the National Museum. On account of the interest just now attached to the locality they seem worthy of a special description. It is well to remark in the beginning that none of the samples received show freshly fractured surfaces, but are in the form of irregular blocks with their corners broken and rounded. They were accompanied and covered with a fine sand and dust of the same mineral nature as the rocks themselves, but stained by sulphur and iron oxides. Even in the absence of definite information on the subject, it seems safe to infer that they are simply ejected volcanic blocks, and not from recent lava flows, none of which have as yet been reported.

Two varieties of the rock were received, one consisting of a light-gray, slightly purplish, fine grained and porous groundmass, in which small glassy feldspars and dark brown and green hornblende-like crystals are readily distinguishable by the naked eye. The texture is quite uniform, the brown hornblende being the more variable constituents, in one case a single crystal nearly half an inch in diameter being observed. The rock is rough to the touch and somewhat friable. Under the microscope it is found to consist of a light gray groundmass, in which are embedded deep reddish brown, strongly dichroic hornblendes, light green augites, and numerous crystals of a plagioclase feldspar, together with scattering grains of iron ore. The hornblendes are usually in irregular crystals, though an occasional quite perfect basal section was observed which showed a preponderance of the prismatic faces. The crystals are often elongated in the direction of their vertical axes, and a portion of them show the dark borders so commonly seen in the hornblende of andesites. The augite is light green in color, and at first glance might readily be mistaken for a green variety of hornblende. Its cleavage and optical properties are, however, unmistakably those of augite.

In form the plagioclases are short and thick, showing but few twinning striations, sometimes none at all. A portion of them are clear and pellucid, while others are clouded through the presence of numerous cavities and impurities. In many cases the outer portion of a crystal is clear, while the interior is clouded, or again both outer and interior portions may be clear while there exists an intermediate zone full of cavities. In addition to these the plagioclases contain numerous inclosures of a yellowish glass, which often bears a bubble, and hornblende and augite particles. A number of short and thick, clear, glassy feldspars are present, which show no sign of twinning, and which appear from their optical properties to be sanidin. Both sanidin (?) and plagioclase show at times a very evident zonary structure.

Apatite occurs but sparingly and in minute colorless crystals, showing but slight trace of the dusky interiors so often seen in the apatites of this class of rocks. The magnetite is, as a rule, in but poorly defined crystals.

The base proper of the rock consists of an aggregate of minute colorless microlites* and grains of opacite; there is also present a very weakly doubly refracting, colorless, interstitial substance, which, under a power of 300 diameters is seen to be composed of rounded and irregular imbricated

*In a preliminary note on these rocks, published in Science of December 12, 1884, the base was stated by mistake to be *microfelsitic*. It should have read *microlitic*.

scales like tridymite. So far as observed, however, none of these scales present a regular hexagonal outline, but resemble more closely those figured by Rosenbusch* than any I have seen figured elsewhere.

The dark variety of the rock is much more compact in texture, and bears a larger proportion of microscopic hornblende, which occurs in crystals of all sizes up to one-fourth of an inch in diameter. Under the microscope it is found to contain also a much greater proportion of minute feldspars scattered through the groundmass. As in the lighter variety, these are short and thick, being usually not more than twice as long as broad. The groundmass is much more dense, but under a high magnifying power is seen to consist mainly of the same colorless microlites and iron ore. Little, if any, tridymite is present, and no true glass was observed. In other respects the varieties seem nearly identical.

Samples of the rock submitted to Dr. T. M. Chatard, of the Geological Survey, for chemical analysis, yielded results given below:

[I is the light-colored tridymite-bearing variety; II, the dark variety.]

	I.	II.
Ignition	.99	.34
SiO_2	56.07	51.54
TiO_2	1.24	.32
Al_2O_3	19.06	20.31
Fe_2O_3	5.39	4.64
FeO	.92	3.56
MnO	.23	.32
CaO	7.70	9.55
MgO	2.12	3.16
P_2O_5	.16	.57
Na_2O	4.52	4.29
K_2O	1.24	2.47
	99.64	101.07

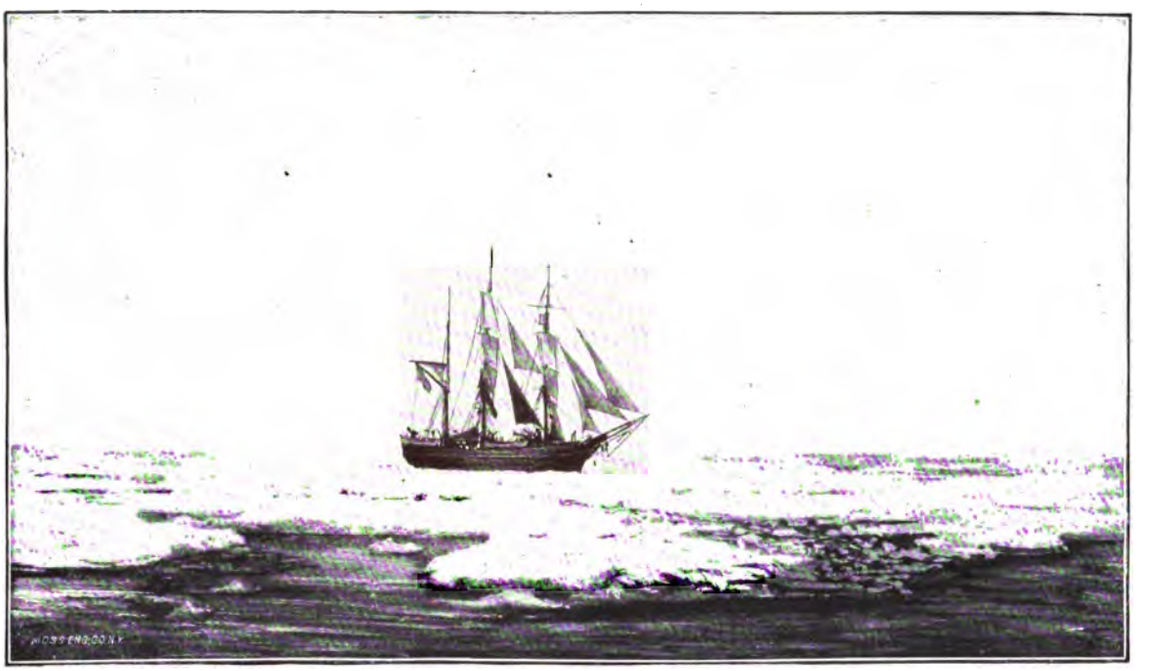
The low percentage of silica in the rocks is especially interesting, and would seem to point to the presence of very basic plagioclases. To satisfactorily determine this point an attempt was made to separate the feldspars from both rocks by means of the iodide of mercury and potassium solution. At a specific gravity of 2.7 a considerable quantity of the powder from the light variety came down, which, on examination with the microscope, proved to be nearly all feldspar, with small portions of the groundmass, and included iron ores and hornblende particles. After standing over night a further precipitation was observed to have taken place, which, on examination, proved to be very pure feldspar. A sample of this last submitted to Professor Clarke for further examination yielded 55.29 per cent. of silica, which is about the right proportion for labradorite. Owing, however, to the somewhat crude method of separation, I do not feel at all certain that this is the only feldspar present, and it is very probable that with better facilities other results might be obtained. It is possible that the first portion to come down may have been anorthite, as suggested by Mr. Diller in Science of January 23, 1885.

With the dark variety of the rock no satisfactory results could be obtained, it being found impossible to separate the very impure feldspar from the groundmass with any facilities at my command.

Especial thanks are due Professor Clarke and Dr. Chatard for the excellent chemical work done by them in this connection.

NATIONAL MUSEUM, *February* 23, 1885.

* Mikroscopische Physiographie der Mineralien, etc., p. 227.



WHALER WORKING THROUGH A LEAD.

NATIVE HOUSE AT POINT HOPE, ALASKA.

A NARRATIVE ACCOUNT

OF THE

EXPLORATION OF THE KOWAK RIVER, ALASKA,

UNDER THE DIRECTION OF

CAPT. MICHAEL A. HEALY,
Commanding U. S. Revenue Steamer Corwin,

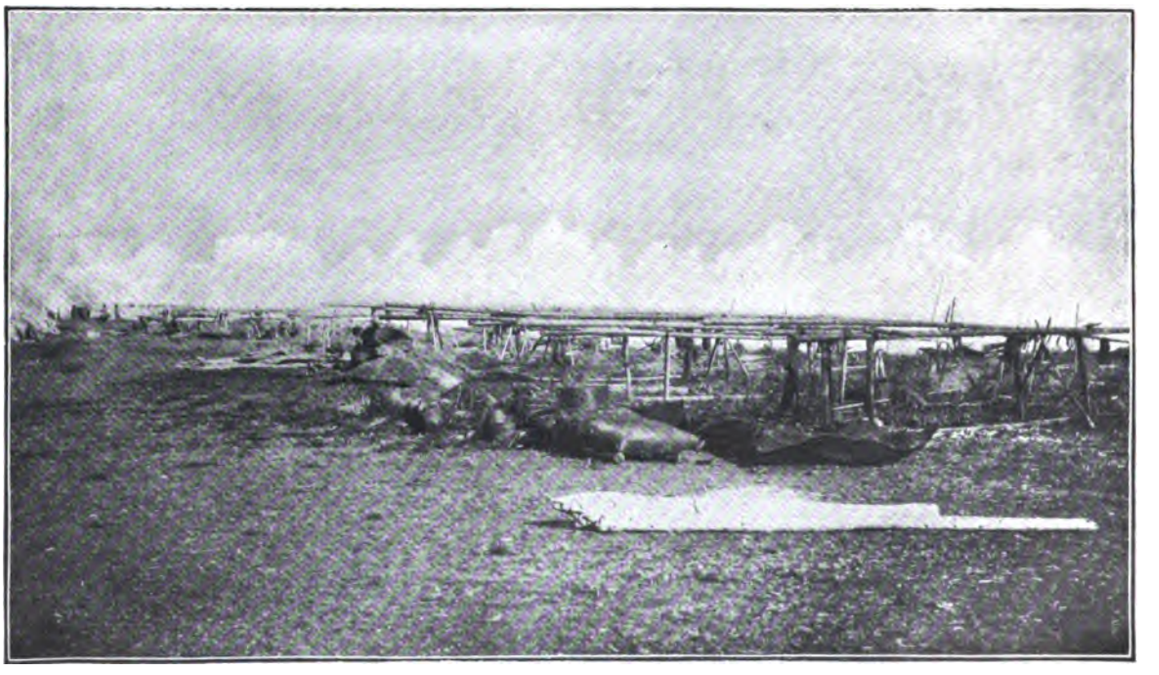
BY

THIRD LIEUT. J. C. CANTWELL,
U. S. Revenue Marine.

1884.

(ILLUSTRATED WITH FOUR PLATES AND FOUR SKETCHES.)

SUMMER TRADING RENDEZVOUS, HOTHAM INLET.



SCAFFOLDING FOR DRYING FISH, HOTHAM INLET.

ORDERS TO LIEUT. J. C. CANTWELL.

U. S. REVENUE-MARINE STEAMER CORWIN,
Kotzebue Sound, July 8, 1884.

SIR: The Department desiring to ascertain the extent of the Kowak River, together with the character of the country through which it runs, the number and extent of its tributaries, the number, condition, habits, and customs of the inhabitants, and, in general, everything of interest to science and commerce relating thereto, you have been selected to take command of an adequate party from this vessel, and to proceed to the mouth of the said river and begin the compilation of the data required, extending your explorations as far toward the source of the river as is possible with boats, and until the 20th day of August, 1884, when you will rejoin the *Corwin* at Hotham Inlet.

In pursuit of the object mentioned you will make as accurate a survey of the river as is possible with the instruments furnished and the time allowed you.

You will keep exhaustive notes of its width and depth, and force of the current, as well as an accurate account of the position of obstructions to navigation, such as rocks, shoals, sand-bars, or rapids, occurring in the course of your survey.

All information touching the fauna and flora and the general resources of the country is of the utmost value, and you will be particular to see that such a record is kept as will furnish the substance of an accurate report on these subjects. Mr. Miller, who is to accompany you, is a practical miner, and you are directed to give him every opportunity for prospecting the country, and to embody in your report the result of his investigations.

In this connection it may be well to call your attention to the supposed existence of jade in this region; if this supposition should prove true the discovery would be one of great value. Frequent reports of your progress will be sent by native messengers to the *Corwin* at Hotham Inlet.

Should the Kowak River prove not of sufficient length to warrant a survey, you will turn your attention to the survey and exploration of Selawick Lake, or any navigable stream which you may discover in the neighborhood. As many specimens as possible will be collected. They will belong to the Government, but where duplicates are obtained there will be no objection to the members of your party procuring them, providing that in case of a preference by selection the Government shall have the precedence.

It will perhaps be found necessary in your communication with the natives to engage in trade in order to secure their help in case of need, and consequently you are permitted to do so for that purpose; but you will understand that this permission is restricted, and on no account are you to make a display of goods in a manner calculated to excite their cupidity or awaken their distrust.

In dealing with the natives you will be careful to enforce the strictest integrity on the part of each member of your party, and should a collision take place between your people and the natives you will try and make good your retreat without bloodshed. If, however, this be impossible, act with firmness, decision, and moderation. Should any of your party become seriously ill you will abandon the expedition and return to Hotham Inlet, and there await the *Corwin's* return. In case she does not return before September 19, 1884, you will take her absence as an evidence of acci-

dent, and you will then proceed with your command to St. Michael's, or the Diomedes Island, and from there take passage for yourself and party by the first vessel bound for San Francisco or any other port of the United States, reporting your arrival in the United States to the Secretary of the Treasury, and await further instructions. You will use your discretion in the manner of your reaching St. Michael's, and should you decide to go by land, you will lay your boats up carefully and start as early as possible after the 21st day of September, 1884. In case you discover any tributary or other communication leading from the Kowak into the Arctic Ocean or Bering Sea, and the journey to either outlet will consume more than the time allowed you, you will first communicate with the *Corwin*, and in no case will you place yourself or your command in a position where such communication will be impossible, or where you will be compelled to winter in the country.

I would particularly caution you to be economical in the expenditure of your ammunition and provisions.

Second Assistant Engineer McLenegan has been specially detailed to make a collection of specimens of the fauna and flora, and of the birds and fishes peculiar to this region, as well as to make notes in regard to the general features of the country through which you may pass.

In addition to these special duties he will at all times be subject to your orders as to any assistance you may require of him in your survey of the river. You will afford him all possible assistance in the performance of the duty to which he has been assigned.

In ascending the river, in case the launch become unserviceable through any cause whatever, you will cause her to be placed in a secure place and properly protected from the weather, and leave, if possible, a responsible person to take care of her until you descend the river, when you will bring her down with you to the vessel.

Wishing you a pleasant voyage and feeling confident of your ability to make it a success,

I am, very respectfully,

M. A. HEALY,
Captain, U. S. Revenue Marine.

Lieut. J. C. CANTWELL,
U. S. Revenue Marine.

LETTER OF TRANSMITTAL.

U. S. REVENUE STEAMER CORWIN,
San Francisco, Cal., November 13, 1884.

SIR: Herewith I have the honor to transmit a transcript of the journal of the progress of an expedition sent from the *Corwin* during the last summer for the exploration of the Kowak River.

A chart of the river, as far as has been explored, showing the surroundings, width, and character of the shores, in detail, is now being prepared and will be finished in the course of a week or ten days.

While I regret the failure of the expedition to accomplish the prime object for which it was sent, namely, the exploration of a lake which is supposed to exist at the headwaters of the river, I can not refrain from saying that much useful information and experience have been obtained, which will be of great service in future explorations in this direction. There seems to be no reasonable doubt of the existence of a large lake at or near the headwaters of the Kowak. The Indians speak constantly of it and say that from the mountains around its upper portion the "sea is visible in one direction." They also report that short portages are here made which bring them to the Yukon River by way of the Kuryukuk in one direction and to the sea, by way of another river, in the other. The query arises: Is this latter the Colville River? If so, a ready means of communication could be established between the settlements on the Yukon River and those on the shores of the Arctic Ocean. The importance of such a communication can hardly be overestimated. The vast tract of country lying within the Arctic Circle and between meridians 135° and 165° west longitude remains practically unexplored. With the exception of the coast and the comparatively small portions drained by the Porcupine and Kowak Rivers, this vast region is as little known as when first discovered. That this country is rich in mineral deposits is fully attested by the many specimens of ore brought to the coast by the nomadic tribes of Indians who roam the mountains in search of the bear, moose, and deer during the winter months, and by the frequent indications of gold and silver seen by our party in our progress up the Kowak. These indications increased as we advanced, and the conclusi n is irresistibly reached that among the high mountains which form the watershed for the Kowak, Kuryukuk, and (possibly) Colville Rivers the precious metals may be found in large quantities.

The question of the commercial importance of explorations in this region, however, sinks into insignificance when their relation to the cause of humanity is considered. Scarcely a year passes that does not carry with it a sad record of suffering and disaster to those whose business or duty brings them into the waters of the Arctic Ocean. In the pursuit of their calling the hardy whalemen often press to the eastward beyond Point Barrow, and sometimes it happens that, lured on by their rich quarry, they are delayed until the ice forms around Point Barrow and their retreat in this direction is cut off. If it were known that a communication by river could be made with the Yukon there would still be time enough to lay their vessels up in some convenient bay on the northern coast and reach civilization and safety before the long, dreary winter sets in. But in the absence of any authoritative information on the subject, they look with sailors' natural dread on the dark wilderness, and, with a wild hope that they may yet escape, turn their ship's head toward the treacherous ice. A crushed and dismantled hulk, a few bleached and mangled bones,

or a wild disjointed story of misery and death related by the natives too often shows how bitterly hopeless was the struggle!

I am happy to be able to say that our relations with the natives were without exception most cordial and friendly, and I believe should another expedition be sent up the river they will be found ready and anxious to help it forward with all means at their command.

In conclusion, I may perhaps be excused if I congratulate you upon your selection of Mr. McLenegan to prepare a report of the natural history and resources of the country through which we passed. After reading his report I am convinced that its completeness leaves nothing to be desired.

Thanking you for the confidence you evinced in selecting me to take charge of so important a work, and again expressing my regret that circumstances so combined as to defeat in a measure the prime object of the expedition,

I am, sir, with much respect, your obedient servant,

JOHN C. CANTWELL,
Third Lieutenant, U. S. Revenue Marine.

Capt. M. A. HEALY,
Commanding Revenue Steamer Corwin.

EXPLORATION OF THE KOWAK RIVER, ALASKA.

July 8, 1884.—The expedition for the exploration of the Kowak started from the *Corwin*, anchored off Cape Krusenstern, and headed in towards Hotham Inlet. The party was composed of the following:

Third Lieut. John C. Cantwell, in charge; Second Assistant Engineer S. B. McLenegan; Quartermaster Horace Wilbur; Fireman Frank Lewis; James Miller, miner; Andre Fernda, guide and interpreter.

We had two small boats in addition to the steam-launch of the *Corwin*, and in them were stowed such articles of camp outfit and supplies as could not be carried in the launch.

We made but slow progress against the brisk wind blowing from ahead, and it was not until near noon that we reached smooth water under the lee of Cape Blossom, and began our search for a channel through Hotham Inlet. This proved no easy task, and the assistance of Pilot Douglas, who joined us at this juncture with the surf-boat, was most opportune and welcome. While we sounded along the western edge of the shoal, which lies at the entrance of the inlet, Mr. Douglas searched for the channel along the north shore, but at 5 o'clock we met, and neither party had been successful. Soon after, the tide falling, the launch grounded and we were compelled to bring to. The eastern side of the shoal still remained unexplored, and Mr. Douglas and I started in this direction with the surf-boat, leaving the launch aground in about two and one-half feet of water. We stood well over towards the eastern shore of Hotham Inlet, and when about half a mile from the beach suddenly ran into a deep channel, which evidently formed the entrance to the inlet. We returned to the launch and lightened her of everything movable, and by dint of hard shoving with oars and poles were enabled to reach the deep water, and at 7 o'clock selected a suitable place to remain for the night and pitched our tent on the beach. Mr. Douglas returned to the *Corwin* after we had completed our arrangements for the night, and I took this opportunity of reporting our progress to Captain Healy and to request him to send me a patent log and nautical almanac which had been left behind. Distance made, 22½ miles. Average temperature, 85°.

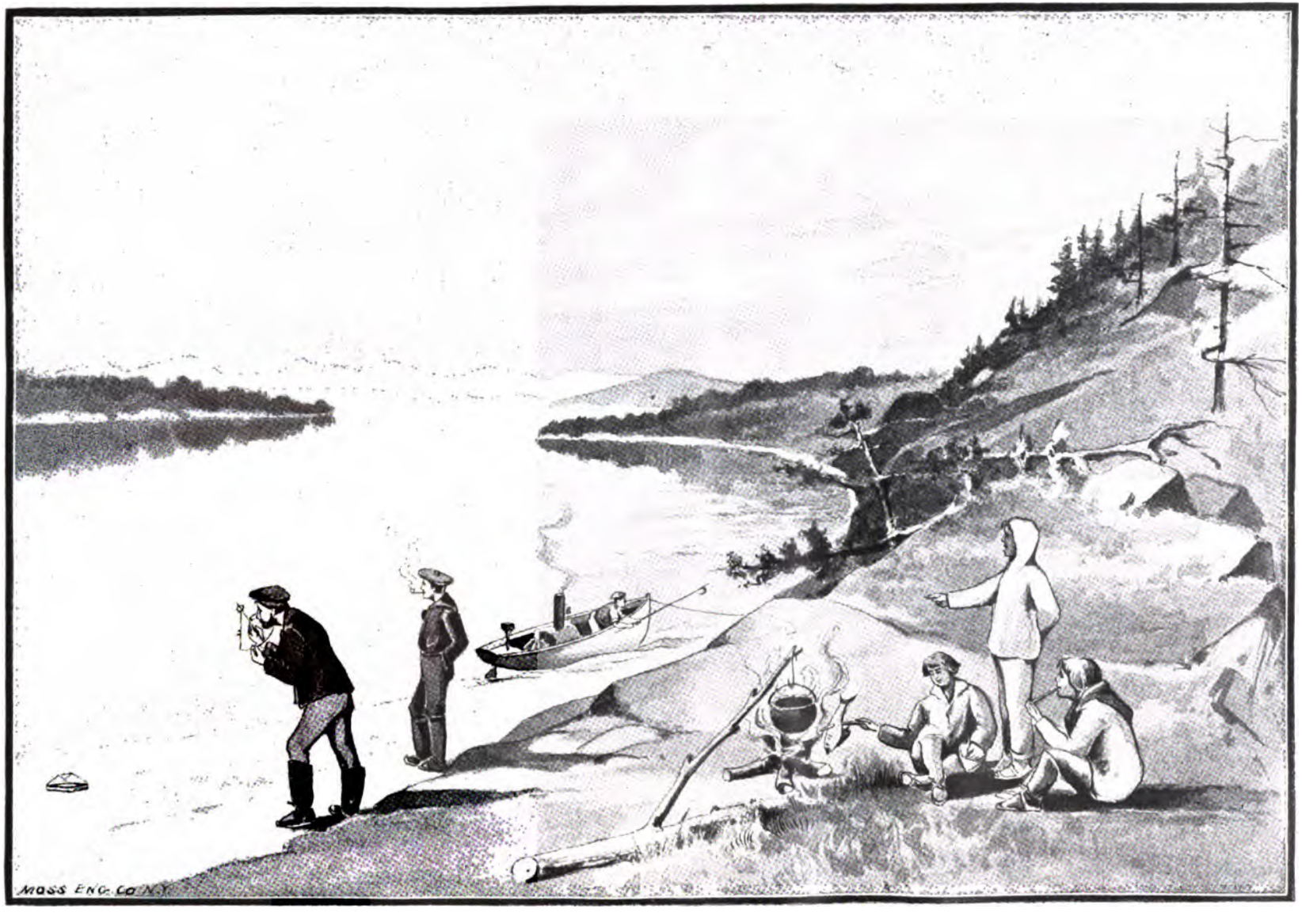
July 9, 1884.—The day commenced with a fresh southeast wind and rainy weather, and so continued throughout. As I had to wait for Mr. Douglas's return, I employed the time in breaking out and restowing our supplies, and in repairing the frame of the skin boat, which had been somewhat strained by being heavily loaded. Stepped mast in launch and bent sail, and fitted awning so that it could be spread without unstepping the mast every night. I read to the party my orders to-day and explained to them the general objects of the expedition, the confidence I had in its success, and the desire that we would strive, by a strict attention to duty and a careful consideration of each other's feelings, to make the trip as pleasant and as free from dissension as possible. I assigned Wilbur to the general care of the boats and their gear; Lewis to the engine under the supervision of Mr. McLenegan, and to Mr. Miller the care and expenditure of provisions was entrusted, he being the most experienced man of the party in this matter. Andre was instructed to help Mr. Miller when necessary. At 2 p. m., seeing no signs of the surf-boat's return, we broke camp and were about to stand on our way when the surf-boat was discovered in

the sound heading towards us. She shortly afterward came up, and Mr. Douglas delivered me the articles I had requested, and a few extra provisions which had been sent by our shipmates on the *Corwin*. We now stood for the entrance to the inlet, running up a deep channel which trends close to the eastern shore, finding from four to five fathoms of water. Rounding the bluff headlands of Hotham Inlet we stood up the bay to the southeast, finding a disagreeable head sea and wind to contend against. We constantly shipped water forward, and as the two boats towed hard, but little headway was made. The shores on the right side of the bay were steep and composed of clay bluffs some two or three hundred feet high, backed by rolling tundra land. The left shore, however, was low and swampy and covered with many lagoons. I learned from the Indian guide Natorak, who had been sent by Captain Healy to accompany us, that the Kowak had fifteen mouths, and that the low shore on our left was the delta, and was some fifty miles in length. Toward 9 o'clock I observed a lagoon on the right side of the inlet which afforded a good shelter from the wind, which was now on the increase, and we made for it. At 10 o'clock we came to and pitched the camp, having made 22.5 miles. Average temperature, 90°.

July 10, 1884.—The day commenced with a strong northeast wind, and as the Indian informed me that the sea would be much heavier as we proceeded further up the inlet, I determined to wait until the gale had abated. In order to lighten the boats as much as possible, I made a cache here of three cans of pemmican, two cans of potatoes, an oil stove, and a can of coal oil, these articles being thought unnecessary for immediate use. At 10 o'clock the wind decreased and the sea rapidly went down, so that we were enabled to get under way. Stood up the bay and got along very well until we lost the shelter of a point jutting into the inlet from the west side. The soundings gradually decreased from four fathoms of water into as many feet, when we kept away again towards the mouth of the river. At 7 o'clock we observed a break in the low land of the delta, and Natorak pointed out the channel leading to the mouth of the river. A remarkable peak ahead and a high bluff point on the western shore form a range for this entrance. We carried in one and a half fathoms, but the channel is narrow and would be difficult to find. This mouth of the river is some two hundred yards in width, and we found from two and a half to three fathoms of water, with no shoals or obstructions. The banks are low and marshy and covered by a dense undergrowth of willow and birch trees. At 8 o'clock we pitched our tent on the right bank, and were immediately attacked by myriads of mosquitoes, which seemed to be of the most malignant disposition and made the work of the camp a most disagreeable duty.

July 11, 1884.—At 5 o'clock all hands were called and a hasty breakfast prepared. At 7.30 we were under way once more and stood up the river. Both banks continued low and are covered with a dense undergrowth. We passed many deserted huts, but saw no natives until about 10 a. m., when we observed a collection of huts on the right bank, and upon landing discovered a native and his family, who were greatly surprised at our appearance. The children were perfectly naked and retired precipitately to their huts. Here we were informed that many natives had starved during the winter. After leaving this place the banks gradually increased in height, and the current, which had been reckoned at two knots per hour in the morning, increased to three knots by night. The course of the river was exceedingly tortuous, and we sometimes found ourselves, after running two hours, back within a quarter of a mile of our starting point. At 4 o'clock a group of huts was observed on a high black bluff on the right side, and we ran into a little creek near by and landed to communicate with the natives. A letter was handed to me which had been left by Lieut. George M. Stoney July 27, 1883. He named the settlement Gilderville. Soundings were regular throughout the day and showed an increase of from three and a half to five fathoms, and the width of the stream varied from one-half to three-quarters of a mile. Many offshoots of the main stream were observed and all were on the left side. At 7 p. m. we came to and pitched our tent, having made 31½ miles. Average temperature, 85°.

July 12, 1884.—At 7.30 a. m. we got under way, after leaving two bags of coal here to take us to the mouth of the river on our return. Up to this spot no timber had been seen, but during the day we passed many clusters of pine trees, and towards the night the banks were well covered with a growth of pine, birch, and willow. At 8.30 we stopped to cut wood in a bend of the river where it has a large offshoot running to the westward. Natorak informed me that this was the last branch of the river delta, and flowed into Hotham Inlet near its lower portion. At 9 o'clock



TAKING AN OBSERVATION.

we started up-stream again, but the steam rapidly fell and we were compelled to stop and try another kind of wood. At noon the sun came out and I got an observation for latitude and fixed the position at 66° 45′ 17″ north, longitude 161° 46′ 10″ west. At 1.30 went ahead again, but after the pressure attained by standing still had been reduced, the steam rapidly fell and we were again compelled to stop. The wood was now split up finer and we tried it again, this time with better success, and we were rejoiced to see the little launch slowly but surely forge ahead against the strong current. At 2.30 we discovered a remarkable glacier-like formation extending for a distance of three-quarters of a mile along the right side of the river. A solid mass of ice, superposed by a thin layer of dark-colored soil, the whole rising to a height of some 150 feet, forms the bank. Trees stood toppling over the edge of the bank, ready to fall, and others had fallen and lay like a fringe along its base. At 9 p. m. we reached a narrow bend in the river and found the current running with great velocity. In attempting to anchor for the night the warp was violently jerked out of Andre's hands and the anchor lost. We immediately set to work to recover it by dragging the bottom, but as there were from six to eight fathoms of water and the current ran about seven knots, we were unsuccessful. Distance made during day, 24½ miles. Average temperature, 90°.

July 13, 1884.—The day began with a light southeast wind and rain. At 6.30 we had breakfast and recommenced search for the lost anchor. Finding drag-lines of no service, long poles with hooks on the ends were substituted, but after three hours' work I was compelled to give it up and proceed up the river. We made a temporary anchor of willow forks in the absence of anything better. Up to this time not a sign of a stone had been seen on the banks, nor, indeed, had any been brought down with the ice, the crumbling nature of the bank would have prevented its remaining there. During the night I was awakened by a sudden and tremendous roar, and in the morning I observed the cause of the disturbance. A huge piece of earth, one hundred feet square, had become detached from the bank and had fallen into the water. All day long the river grew narrower and the current more rapid. The bends were more abrupt and around the longest sides of the bends the water swirled into eddies too strong for the launch to overcome. Foot by foot the little craft crawled up in the backwater, and we took advantage of every projecting point to get ahead. We experienced much trouble in keeping steam. During the afternoon we ran into a reach of the river extending for about six miles in a northeasterly direction, and the vista was one of surpassing loveliness. The river suddenly widened to half a mile, and both banks were low and green in the sunshine, while beyond and partly hidden by a light mist a range of rugged mountains could be seen, lying cool and tranquil in the distance. At the end of this long reach in the river we came upon a succession of high bluffs formed by the foot-hills of the mountains running in on the river. Their sides were clothed with the sweet-smelling pine and juniper, and a narrow, rocky beach lay at their bases. Here we pitched the camp at 7.30 p. m. The sides of the hills were dotted with many species of wild flowers, and under the pines the moss-covered ground was like velvet to the touch. We would have called it Utopia had not the mosquitoes nearly driven us wild. As it was we named the halt Highland Encampment. To-day we added 24.9 miles to the distance already made.

July 14, 1884.—At 5 a. m. called all hands and began cutting wood. The day began with rain and so continued throughout. At 10 a. m. we finished wooding and breakfast and stood up the river. At 1 p. m. we discovered a river running in from the northeast. The native name is Sheeleelictok or Squirrel River, and its source is in the mountains, one day's portage from the headwaters of the Nunatok, which flows into Kotzebue Sound at Hotham Inlet. Here we were puzzled as to the proper course to take, as three water ways, all equally large, were in sight. However, choosing the center stream as likely to be the best, we pushed ahead, and soon entered into a part of the river where many sand bars contracted the channel so much that it was hard work to get ahead against the current.

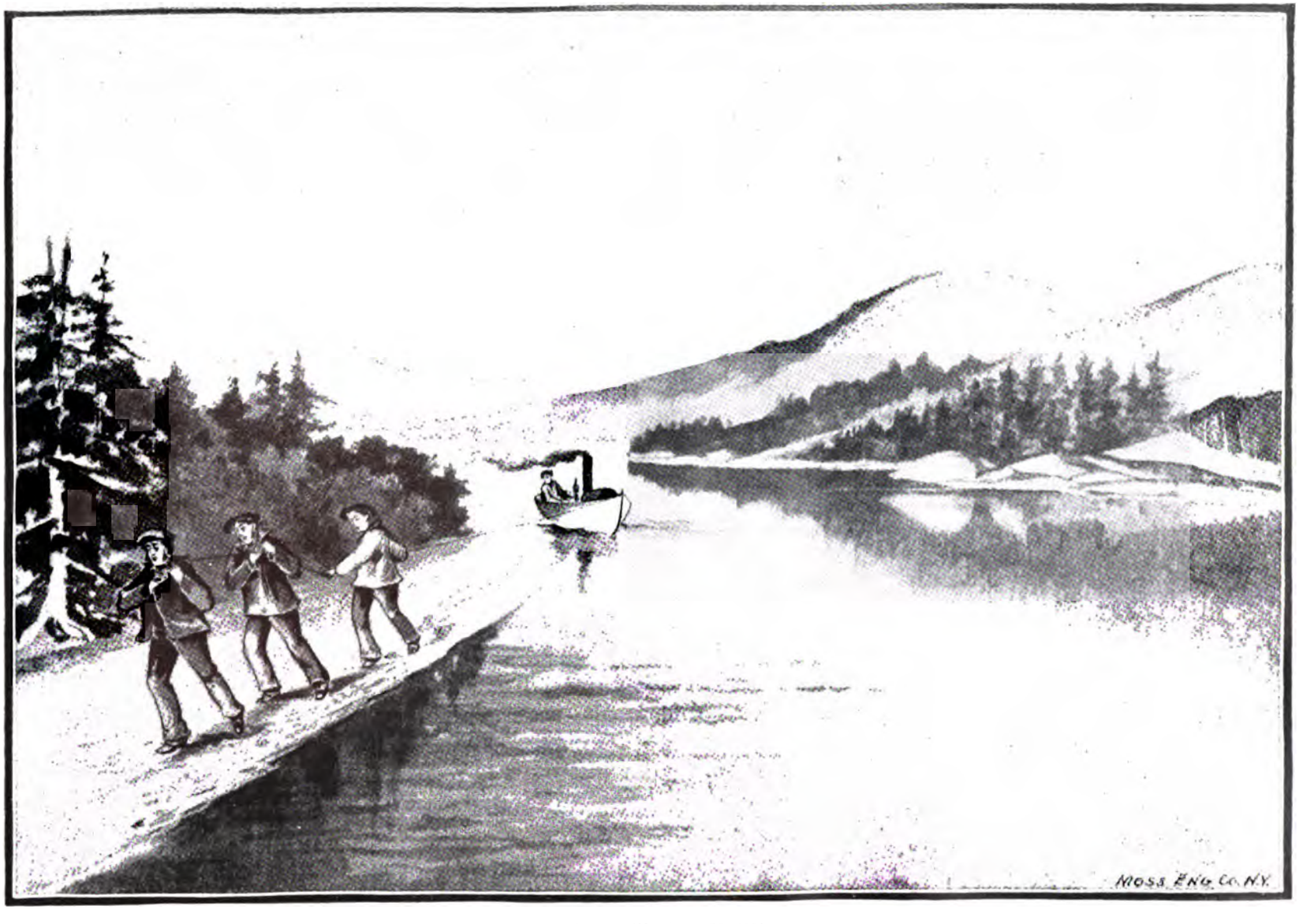
We could not keep steam sufficient to go ahead more than for about ten minutes, when we would be compelled to stop and "bottle up." Early in the afternoon the current became so rapid, and we got on shore so many times, that I dropped the two boats and ordered them ahead in shoal water under the care of Andre and Natorak. The left shore was high, rolling land to the water's edge, and terminated by a beach composed of variously colored stones of lime formation. Huge bowlders of metamorphic rock crop out at intervals from among the dense growth of pine and

birch which lines the shore. On the right side the shores were so low that I suspected the land to be an island, and at 6 p. m. I discovered this to be a fact, as we arrived at the other end, where the river is divided into two parts, forming an island of about ten miles in length. At 7 p. m. we pitched our camp on the north point of the island, having made 15½ miles during the day.

July 15, 1884.—At 4 a. m. called all hands and broke camp; had breakfast and got under way at 5 a. m. At 6 a. m. stopped and cached the skiff on a point bearing east from the camp, it being thought unadvisable to tow her any longer. The river gradually broadened, the bends were less abrupt, and along the shores the current was not as strong as we advanced. At about 9 o'clock we found ourselves beyond the mountains at last, and a long view of the river was exposed to our gaze. On our left the mountains were about three thousand feet high and heavily timbered around their bases, while at the water's edge the shore was fringed by drooping willows and alder trees. The mountains in this locality are from three to four thousand feet in height and lie parallel to the river's course. At about noon we noticed a peculiar-looking bluff on the left bank and ran across the river to investigate. The bluff itself was a species of carboniferous sandstone, and near it on the beach we picked up particles of coal which had evidently not been floated very far, as they were but little worn. Pursuing our journey and examining the banks for further evidences of coal, we soon came in sight of a dark-colored bluff jutting into the water from the left side of the stream, and landing, discovered coal in large quantities and of fair quality lying on the surface. With picks and shovels we made a vigorous attack on the side of the hill and soon had the bunkers of the launch filled with coal, and once more we started ahead. It did not burn as freely as we could wish, but there is no doubt that coal of excellent quality is here in large quantities, superposed by a thin layer of inferior coal. The day was rainy and overcast throughout, so that I did not get any observation. The width of the river varied from five to nine hundred yards and soundings from two to five fathoms in mid-channel. At 6.30 p. m. we camped at a deserted Indian village, having made twenty-eight miles during the day. Average temperature, 90°.

July 16, 1884.—The day began with heavy rain and calm; middle part cloudy, and ended with clearing weather. At 9 a. m. the rain decreased sufficiently to allow us to pack our stores, and we broke camp and proceeded up the river. Discovered large quantities of coal in the left bank, which was composed of a beautiful white clay suitable for pottery. We landed and filled our bunkers, but upon trial the coal was found not to burn well, whether on account of its quality or the fact that the clay adhering to it stopped up the draft I am unable to say. To-day we encountered our first rapids; the water rushed around the rocks bordering the left shores with great velocity, and I crossed the river, hoping to find less current under the opposite bank. A slough cut the bank in such a way that I thought the current must be less, but I was mistaken, and the mistake nearly lost the launch. We attempted to cross the slough and get the shelter of the opposite point, but when about half way across the steam suddenly went down and the current bore the launch on to a gravel spit and she rolled over on her beam ends. All hands plunged overboard and righted her, and we got her back by hard pushing and pulling to a safe anchorage. Finding the coal useless for our purposes we threw it out and loaded the boats with wood, and after getting a good head of steam I got a line to the shore and every one, with the exception of the fireman and myself, left the launch and assisted by hauling on the line. In this manner we were enabled to get over the worst part of the rapids, and after the skin boat had been brought over in charge of Mr. McLenegan we pushed on up the river. Our progress, however, was very slow, and we were compelled to stop many times on account of the lack of steam sufficient to stem the current. At 7.30 we arrived at an Indian fishing village, having made but six miles up stream. The river did not alter much in appearance or width, but the number of shoal places increased and the channel was found to be more crooked in consequence. We found the natives busily engaged in repairing their nets preparatory for the run of salmon. They were very kind, but did not have much to offer us in the way of game or fish.

July 17, 1884.—When we awoke this morning the rain was pouring down in a steady stream, and did not cease until 9 o'clock, when we got under way and stood up the river. A number of natives had preceded us to a place where suitable wood could be obtained, and for a small quantity of tobacco agreed to have sufficient quantity of wood cut to last us through the day. Here I saw a specimen of green stone which the Indians informed me had been obtained from the mountains



COAL BLUFFS, KOWAK RIVER, 1884.

about five days further up stream. They say that whoever goes to that mountain and brings away any stone will be afflicted with some dreadful malady ever afterwards, and that the stone belongs to the natives and not to the white men. I argued that the stone did not belong to them individually, but had come to them from their great-grandfathers, who were also our great-grandfathers. This direct claim to relationship did not meet with a very cordial reception, but they were not inclined to discuss the matter any further. All day the Indians hovered about us in their frail birch-bark canoes, and it was wonderful to see with what ease and address they ventured into places where I know the cumbersome launch would have been unmanageable. At 4 p. m. we arrived at a second Indian village and found the natives, as usual, impassive and undemonstrative, but not unkind, for when our fires were lighted a little girl came up and laid a bunch of fresh fish near at hand and then stole away as if fearful of disturbing us. We camped early to oblige the "shaman" of the village, who desired to perform the ceremonies of his office for our especial benefit. After the sun had gone down behind the hills he retired to his tent, and shortly afterwards a tremendous beating of drums, singing, and howling were heard from the interior. The front of the tent was thrown back and the "shaman" was discovered sitting between his two wives, alternately beating a tambourine-like drum and uttering short sentences as if in conversation with some unseen party. A crowd soon gathered, and the utmost attention was given to the imposter, who, I must say, acted the rôle of medium to perfection. We left him in his glory at about 9 p. m., but the sound of his drum was heard until long after midnight. To-day we made 14½ miles. The river varied from two to six hundred yards in width. The banks were moderately high, and back of them was the usual rolling tundra land running to the mountains about twenty miles distant. Soundings were from two to five fathoms and the current varied from two to six knots per hour.

July 18, 1884.—We were detained as usual this morning by a heavy rain, which began at about 4 a. m. and continued until 9 a. m., when the wind came out from the northeast and the weather gradually cleared sufficiently to allow us to break camp. Before leaving I was called upon to treat a native for colic, and relieved him by administering a dose of Pain Killer and applying a mustard plaster. To-day we had another experience in the rapids. Shortly after leaving the village we came to a part of the river where it is about half a mile wide and the depth of the water decreases from six fathoms to as many feet. The channel contains more water, but the shoals extend in all directions, and in some places are bare. The velocity of the current was about seven knots, and it was only by bottling up steam and getting out warps ahead that we managed to get through and in view of a beautiful part of the river. Ahead and on our left high, rugged mountains, whose summits were still covered by snow, were reflected with mirror-like truth in the now placid stream. Between us and the mountains there stretched a low, undulating country, crossed by many streams which tumbled down the gulches and formed cascades and small lakes, giving life and spirit to the picture. In this way we struggled on, sometimes finding the current almost too strong for us to stem, and then hardly perceptible. Wood along the banks became scarce, and we were much delayed in getting a supply. At 7 o'clock a high serrated mountain was discovered ahead, and the Indian guide told us it was the Ashiganok or green-stone mountain. The mosquitoes were worse than ever, and some of our party were almost unrecognizable from the effects of these pests. It is no uncommon thing to see a man who has been cutting wood a little way from the banks suddenly drop his ax and rush frantically for the river, his face and hands covered with blood. The hoods we made are but little protection, as the mosquitoes sting through the cloth with apparent ease. At 7.30 p. m. we camped on a high wooded bluff on the right side of the stream, having made 14½ miles during the day.

July 19, 1884.—Begins with heavy rain and cloudy weather. Mid part cloudy and ends cloudy, with passing showers. At 5.30 a. m. called all hands and began cutting wood. At 9.30 finished breakfast, broke camp, and got under way. During the day the left shores were observed to be low, with rolling back-country to the mountains, sixteen miles distant, varied by occasional ridges running in at an angle with the river course and forming bluffs. On our right the banks were from seventy-five to one hundred feet high, with high rolling country back of the river, covered by a thick growth of pine, birch, and spruce trees of small size. The Indians still hovered about our expedition, now dropping behind and again shooting ahead to show us the deep water. Two of their number were induced to join our party and help Andre and Natorok with

the skin boat. For this service we were obliged to give them something to eat in addition to a small quantity of tobacco. They all say that they do not want much pay, but "something to eat." I sent one fellow gunning during the afternoon, and he promised to be back the next day. Our expedition wound its slow way along the banks of the river, sometimes getting ashore in shoal water and sandy bottom, and then escaping, as if miraculously, being dashed onto the rocks, which were only to be discovered by a peculiar ripple on the water. In mid channel there are no obstructions, but alongside of the bank, in the present stage of the water, many jutting rocks lie just beneath the surface. About 3 o'clock we observed a dangerous ledge which makes out from some high rocky cliffs on the right and extends about thirty feet into the river. All day we have been steaming toward the mountain of the mysterious green stone; sometimes standing up plain to our sight and sometimes obscured by heavy masses of clouds, its presence was ever felt, and it seemed to me to hold within its shadows some mysterious charm, some fascinating secret which must be wrested from its grasp. As the day closed and the soft light of night came on, we pitched our tent on the side of a woody hill. A beautiful waterfall tumbled down its sides, and amid the trees I saw the familiar forms of the robin, the swallow, and the sparrow, and as they fluttered about our camp our thoughts were carried back to our homes. The river is much discolored by the streams running in from the mountains, and are usually of a dark reddish color, while that of the main stream is beautifully clear and several degrees lower in temperature. To-day we made 16.3 miles. Average temperature, 95°.

July 20, 1884.—Begins with moderate southeast wind and rain. Mid part wind shifted to northeast and blew strong with heavy rain squalls. Ends light northeast breeze, overcast and passing showers. The left shores were generally low, with rolling country back to the mountains. On the right the banks were high, and occasionally sand bluffs were observed with a sparce growth of pine trees on top. In many places the high banks had crumbled away and trees had tumbled down with their tops in the water and their roots resting on the accumulation of loose earth near the water's edge. At 4 a. m. called all hands and began usual preparations for the day. At 8.30 got under way and stood up the river. In a short time we reached the camp of our Indian fellow-voyagers, and observing a signal made to us we ran in, and the Indian to whom I had given ammunition to hunt with the day before brought us a brace of geese as the result of his night's work. Our stock of meat, small in the beginning, was growing alarmingly scant. It was impossible for us to get game without delaying the progress of the expedition, as the geese and ducks feed in lakes and lagoons from three to five miles in the interior. To-day as I walked along the banks I saw many tracks of brown bear, and Andre informed me that he had seen bear and porcupine tracks also during the day on the opposite side. Our advance to-day was varied by a season of rest from mosquitoes, but we had to submit to a lesser evil in the form of a violent rain-storm. The clouds hung low on the mountains early in the morning, and toward noon the wind shifted from southeast to northeast, and blew in strong puffs down the mountain gorges. I saw the wind coming and hastily picked up the skin boat, which was being towed along the banks by the three Indians with Andre in charge, and hoisting our sail we sped up stream at a famous rate. For the first time since we entered the river we seemed to be really going ahead, and no amount of rain could dampen the enthusiasm of our party. This, however, did not last long. The rain ceased about 4 p. m., and the clouds rolled upwards and rested on the highest peaks of the mountains. At 7.30 we camped at the foot of a sand-hill on the right side of the river, having made 26.4 miles during the day. Average temperature, 90°.

July 21, 1884.—Begins with moderate southeast wind and partly cloudy with passing showers, and continued so throughout the day. Called all hands at 4 a. m. and got under way at 8. The general character of the shores remained the same as yesterday, but the current was found to be stronger than ever, and about noon we ran into a part of the river where the channel is divided into two parts by a sand shoal extending for about a quarter of a mile parallel to the river's course and reaching nearly from shore to shore. Here the current was found to be so strong that it was almost impossible to get ahead at all. Frequent stops had to be made to allow the steam to run up, and the time thus lost was not regained, as we found with the utmost pressure that we could safely carry that we could not go half as fast as the skin boat, which was being towed and paddled by the Indians. In view of these circumstances I decided to abandon the launch for the present and

go ahead in the skin boat. The back connection and furnace doors of the launch needed some repairing, and it would take two or three days to give her a thorough overhauling, so that if I found the condition of the river warranted me in bringing her up further she would be in better condition to stem the current. We were now quite close to the mountain of the green stone, and I decided to leave Mr. McLenegan and the miner, Mr. Miller, here for three days with instructions to explore the mountains, while I took the launch back to a place where she could be left in safety, and rejoin them at the expiration of that time. Accordingly they were furnished with provisions and such articles of camp outfit as could not be dispensed with, and an arrangement for our meeting having been agreed upon they set out for the mountains and we turned the launch head down stream. We fairly flew now, and I had to order the engine stopped in some places, as I feared if she struck anything she would be wrecked. In an hour's time we had gone eleven miles and reached our place of encampment of the previous night. Observing a number of canoes coming up the river we ran down to them and communicated with the natives. They were going to establish a fishing village near at hand, and I decided to leave the launch near by, as they would render any assistance to Wilbur and Lewis during our absence. Landing with the Indians we held a joint consultation as to my project. I was anxious to obtain their co operation, and wanted to hire a half dozen of the natives to assist us with their boats in transporting our stores, camp gear, etc. At first they declined to go, saying it was too far to the head of the river to get there before the fishing season would be past, and that the men who had been sent after the green stone would give us bad luck, and a thousand other trivial reasons, which had to be discussed over and over again. However, after sitting around our camp fire and smoking our tobacco for half the night, three Indians decided to go with us, with the proviso that they were to be furnished with food from our stores, besides the ammunition and tobacco I had agreed to give them. When I asked how many days it would take to reach the head of the river the most contradictory statements were elicited, and it was evident that their answers were prompted by some other reasons than for giving us exact information on the subject. They all agreed, however, in the statement that the current grows much stronger as the head of the river is approached. The Indians do not travel all the way up the river in boats, as the channel is filled by rocks and the banks are so steep that it is impossible to tow. The river, they say, is divided into two parts, one of which takes its source in a lake twenty-five or thirty miles in diameter and almost surrounded by very high and rugged mountains, while the other rises farther to the eastward, very near the source of the Kuryukuk, a large river which flows into the Yukon at Nulata.

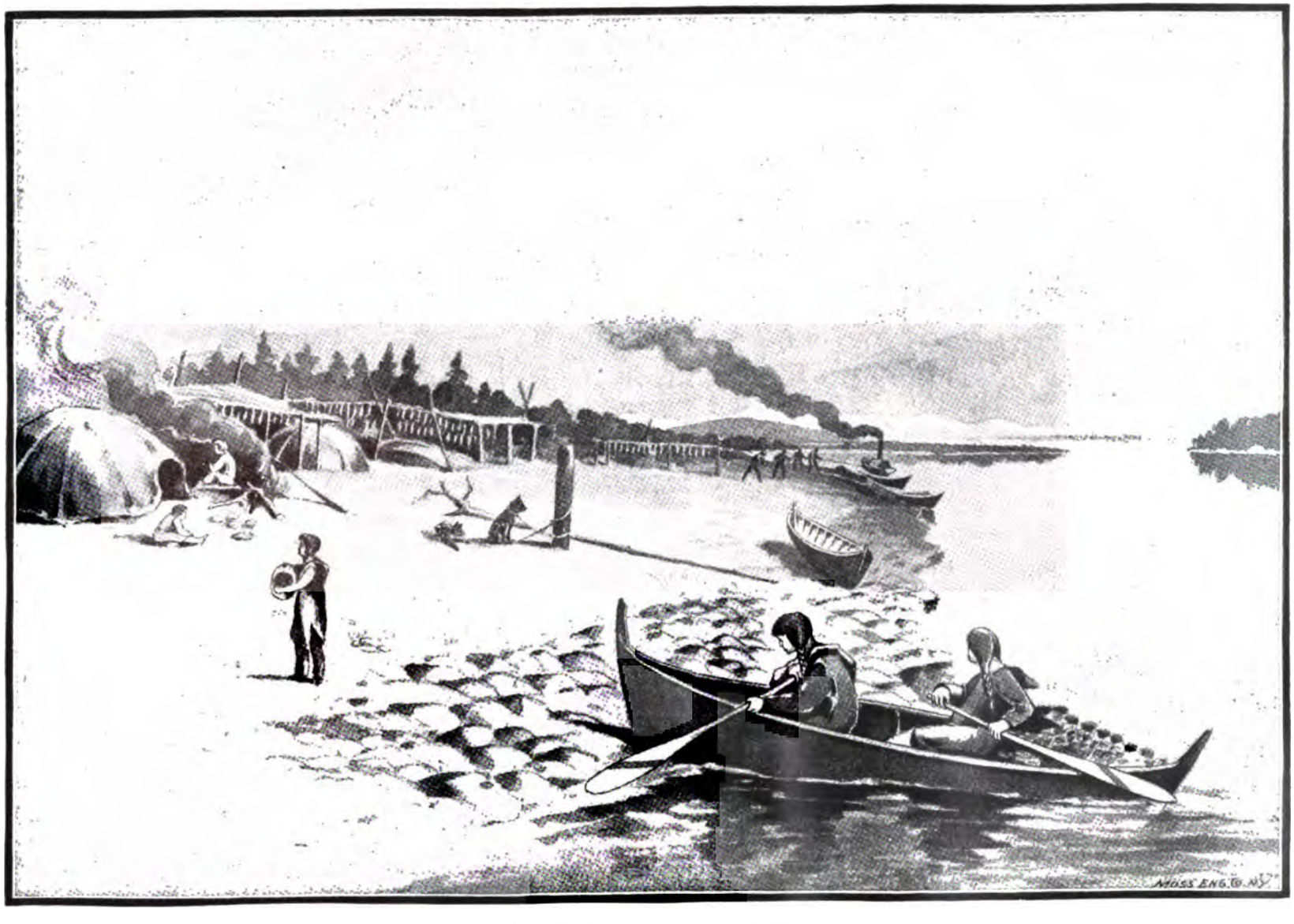
July 22, 1884.—The day was warm and pleasant and was spent in getting ready for our trip in the canoes. We broke out all our stores and bedding and found much dampness everywhere. I was not surprised at this, as it had been rainy and damp ever since we started until to-day. All day the Indians kept near our tent and smoked continually. They did not leave for their meals but had their wives fetch their food to them. I selected a suitable place for the launch to lay while we were gone and started Wilbur to making a temporary boom for the purpose of protecting the launch from floating drift-wood. Lewis, the fireman, was set at work on the boiler. With the clay which had been picked up at the coal bluff the front and back connection were relined and a new lining for the furnace door was cut out. The front connection also required some protection from the rain, and orders were given to attend to it. Towards noon it became evident that the natives were holding a consultation of unusual interest and soon afterwards Andre informed me that they were saying they would not go with me as the summer was too far gone and they must fish. I knew this was a trivial excuse, as the women do all the fishing, but was satisfied that I had to use some caution in expressing my doubts as to their fidelity, and when they came to talk it over with us I gave them to understand that the ammunition which I proposed to give them would more than offset any disadvantages they might experience in going with me. They then demanded half their pay in advance, which was granted, but this did not satisfy them, for they now came back and said I must make deer very plentiful and close to their homes this winter. This remarkable request was occasioned by the fact that they thought I was a "shaman" from seeing me at work with the sextant and artificial horizon. I had no alternative but to promise plenty of deer, and again they were satisfied, and again they came back with more requests until I had nearly lost my patience. However, we kept steadily at work getting ready,

and at 11 p. m. I turned in satisfied that they were at last in a fair way to make an early start with us in the morning. Temperature, 95°.

July 23, 1884.—The day began with a light rain, which toward noon increased to a perfect torrent, and so continued until near 4 p. m., when it ceased and the clouds rose from the forest-covered hills and hung like a veil around the deeply-scarred summits of the adjacent mountains. At 4 p. m. I called all hands, and with the three Indians from the village and one boat to help us we started for our place of meeting with Mr. McLenegan. We paddled lustily along, and where the steep, broken bank allowed a foothold, I put all hands on the bank with a long tow-line, and away we bowled up the river a great deal faster than the launch could possibly go. At 1 p. m. we arrived at the place where we were to meet Mr. McLenegan and Mr. Miller, and, seeing no signs of them, pitched our tent and set fire to a dead tree to apprise them of our return. The birch bark canoe which had been brought along was badly broken to-day by being dragged over a fallen tree, and it is probable we will have to dispense with it. The river rose steadily all through the night, and this morning it is a foot higher than the day before. The Indians say it is very high now, but that later, when dry weather comes on, it will rapidly fall, and the whole bed of the river, with the exception of the channel, will become dry. We made thirteen miles to-day. Temperature, 85°.

July 24, 1884.—The whole day was rainy with frequent squalls. At 7 a. m. Mr. McLenegan and Mr. Miller returned from the mountains, and they were in a terribly exhausted condition. They had been drenched by the rain and tormented by the mosquitoes ever since leaving the river, and their condition was now really pitiable. Their boots had been worn out by hard walking, and they were compelled to cut pieces from their blankets to bind around their feet. Their clothes were torn, and their faces, haggard and blood-stained, fully attested the hardship they had undergone in the brief period since leaving the launch. They brought back specimens of green stone which Mr. McLenegan thinks is jade or nephrite. It was out of the question to think of their going on without rest, and as the birch-bark canoe could not be repaired sufficiently to stand rough usage I determined to push on in the skin boat with Andre, Natorok, and the two Indians, while Mr. McLenegan, Mr. Miller, and the remaining Indian would return to the launch. Accordingly we put the most necessary articles in the skin boat, and leaving the rest in the care of Mr. McLenegan I started ahead. At noon we reached a part of the river where it makes a sudden bend to the southeast, and the jade mountain could easily be distinguished from the surrounding peaks on account of its peculiar greenish color. We made good time throughout the day, passing through a low, rolling country, backed by mountains on both sides. The current remained strong and the depth of water showed no diminution. At 4.30 p. m. we passed a remarkable clay bluff, some 150 feet high and three-quarters of a mile long, on the right side of the river. The constant wear of the ever-rushing stream had undermined the base, and huge masses of the bluff would become detached and fall into the water with a terrific roar, and the oppressive silence of the wilderness would be broken by a thousand echoes from the neighboring cliffs. Mammoth tusks abound in this bluff. Some were seen which were eight inches in diameter, but were out of reach under the water. The course of the stream in this locality is very crooked, and although we made nearly thirty miles to-day our position in relation to prominent mountains in the vicinity had not materially changed. When the sun had set and the shades of night were coming on we reached a deserted village, and as I had sent the tent back with Mr. McLenegan we turned in for the night in a vacant hut, where we were at least safe from the rain. Despite the bad weather we made 28.6 miles to-day. Average temperature, 85°.

July 25, 1884.—The day was warm and pleasant throughout, and we started to pack our boat at 5 a. m., when Andre discovered several places worn through on the bottom which had to be sewed up before we went any farther. This work delayed us somewhat, and it was not until 9 a. m. that we got off. We made excellent time up the river, but the course of the stream is very crooked, and there are a great many islands lying in the bends. The country on both sides was, as usual, spongy tundra backed by rolling country to the mountains, sixteen to twenty miles distant. The banks of the river are moderately high, and composed of a dark-colored soil of a clayey nature, above which lies a thick layer of black earth in which the fiber of decayed vegetable matter can be seen in great quantities. The banks seem to be undergoing a continual change of form, as



SUMMER FISHING VILLAGE, KOWAK RIVER.

we frequently saw portions twenty-five to fifty feet square become detached and fall into the water. Sand-bars and shoals abound in many places, and the current remained about as usual. Every night I set the Indians at work making a map of that part of the river ahead of us, and it is remarkable how exact they are in details. From them I learned that during the winter all the Indians who come down to fish in the summer live near the headwaters of the river, and that after snow has fallen they make sledge journeys to the headwaters of the Koyukuk, where they trade with the Yukon Indians, and then go still farther to the northeast until they reach a range of very high mountains, where the moose and mountain sheep are found in great numbers. From two distinct sources I learned that the sea could be seen from the mountains on a clear day, but in only one direction, the view being shut out in all others by an intervening chain of mountains. On the other side of the mountains where they hunt there is a river by which the sea can be reached in five days. This is doubtless the Colville River. We chased a flock of geese into a small lake which has an outlet into the Kowak this afternoon and killed half a dozen, and as we had had no fresh meat of any kind for some time they proved a welcome addition to our larder. At 9.30 I selected a suitable place to camp and we came to, having made 27.4 miles. Temperature, 90°.

July 26, 1884.—At 5.30 a. m. we started on our way, the weather being warm and pleasant, The beach on which we camped is composed of fine sand in which is a great quantity of mica. and our clothing glistened in the sun as if we had been sprinkled with diamond dust.

Andre put two patches on the boat last night, but she has been so long in the water that she is thoroughly saturated, and the sand which necessarily gets into her by the men alternately paddling and towing her is rotting the skin. The Indians informed me that to-morrow, if we work hard, we shall reach an Indian village where I hope to get a boat and send Andre back with word to Mr. McLenegan to bring forward the launch. The country bordering the river in this locality is a level plain stretching away to the mountains, which extend to the left in a northeasterly direction as far as the eye can see, and on our right there were two ranges visible, the farther one being composed of mightier peaks than that nearer at hand, while over all the scene there hung a light filmy mist, the exhalations from the spongy tundra, softening the ruggedness of the mountains and intensifying the cool grays and blues of the far distance. We came to-day to a place where the river is divided into two parts, the left branch winding its sinuous way round the mountains, while the right, confined by steep, crumbling banks, still follows the general trend of the river to the northeast. We chose the right branch to ascend because of its more directness, and toward evening arrived at the junction of the Kowak with a small river trending to the southward, on which stream I was informed there is a village, where I resolved to go in search of boats next morning. The rain came up just as we had pitched our camp, and we crawled under the boat, all pretty well tired out after the hard day's work. To-day we advanced 25.4 miles. Average temperature, 95°.

July 27, 1884.—At 7.30 a. m. we crawled from underneath our boat and soon after started up the Umakalookta River, which we found exceedingly crooked. I observed a few trees on the banks nearly two feet in diameter, but the shores were mostly covered with a dense and almost impenetrable thicket of Arctic willow and rank grass. In some places the river was fifty to seventy-five yards wide, but as we ascended the shores contracted, and when we stopped at 1 p. m. the stream had diminished in width until it was then but a roaring mountain torrent of some twenty-five feet in width. We found from three to four fathoms of water for fifteen or twenty miles, and then the depth gradually decreased to ten or twelve feet. There was very little current and we made about five miles per hour up stream. At 1 p. m. we arrived at the village and were welcomed with many manifestations of delight. Some of the Indians had never seen white men, and they crowded around me, examining my clothing, etc., with the greatest curiosity. My watch was a source of never-failing interest to all, and whenever I took it out they eagerly pressed around me to see it opened, when they would express their astonishment by uttering the single word "Kay" in a short surprised tone of voice. This ejaculation seems to answer the purpose of expressing either joy or grief, admiration or contempt, acquiescence or disapproval. A traveler soon learns to distinguish the meaning to be conveyed by the difference in inflections. Our two river Indians having explained the object of our trip, we had a consultation in which the entire village joined. I was disappointed to learn that no boats suitable for our purpose could be obtained, as the frail

birch-bark canoes they use in fishing are never taken as far as the head of the river. I was informed that it would take us at least twelve days to reach the head of boat navigation, and that then we would have to leave our boats and travel by foot along the bank of the river one day more, as there are two water-falls to be passed, and the river-bed is filled with rocks, and it would be folly to attempt to pass through the rapids with a boat. I also learned that from this village a portage could be made to the Kowak, and we would strike the river some twenty-five or thirty miles up-stream from the mouth of the Umakalookta. The Indians agreed to help us make the portage if we remained with them till morning. By this means we could retrieve the day lost in coming here, and I determined to take this means of returning to the river. We had some delicious salmon for supper to-night, freshly caught from the ice-cold little stream which flashes down between banks covered with snow to the Kowak, with whose water it mingles and takes up its march to the sea.

July 28, 1884.—At 8 a m. we started on our way to the river by way of the portage, and after eight hours of hard work we reached the Kowak at a point about thirty-five miles from the mouth of the Umakalookta. Our first portage was about a mile over tundra land bordering the Umakalookta up the side of a hill still covered with snow, and down into a small lake, in which we launched our boat; and, in company with about twenty Indians who came along with their birch-bark canoes, we crossed this lake and gained our second portage. Here it was necessary to take the boat through a dense thicket of willows, and the walking was very bad. Over stumps and through mud and water sometimes knee deep we floundered along for a distance of a quarter of a mile, and again we struck the shores of a lake. This was much larger than the first lake traversed, and it took us about four hours to cross it. The high trees of the river could now be seen, but between us lay a morass into which we plunged, and for the space of an hour struggled to get through. At last we succeeded and reached the Kowak, whose broad, unobstructed surface seemed to welcome us back. Launching our boat we paddled away up stream until we reached a small fishing settlement, and here I called a halt, as the skin boat was leaking badly and had to be repaired immediately. Andre soon had two Indian women at work on the boat, and while he was preparing our supper I climbed up on the side of the mountain and looked around me. The river winds its sinuous way around the foot of the mountains and off into the level country beyond, its surface sometimes broken into a thousand ripples by the force of the current, and again lying smooth and glassy under the lee of some projecting point. Far beyond a range of mountains rear their whitened summits to the skies, and the Indians informed me that from the tops of the mountains the high peaks around the head of the river can be seen on a clear day. Briefly stated, our condition was as follows: We were about 125 miles from the launch and had five days' provisions with us. We had still about 275 miles to go before we could reach the water-fall at the head of boat navigation. It would take us twelve days to reach this point. The Indians had agreed to go with us eight days, and they now wanted to return. It would take seven days to get a fresh supply of provisions from the launch, and in the mean time our boat was rotting and becoming unsafe from the wear of the sand unavoidably taken in her and by being dragged over shoal places. In the event of an accident to her my base of supplies was so far removed that it would be impossible for me to reach it without placing my party in a very bad position. Within the last two or three or five days I had observed a considerable fall of the water and a diminution of the force of the current, and as the Indians informed me that the water would now get lower with every day's fine weather, I decided to abandon the present project and to return to the launch, there to make a fresh start, and by working day and night to get both boats as high as the rapids, and then renew the attempt to reach the water-fall with the skin boat. Having reached this conclusion we made ready for an early start the next day for the launch. To-night we were presented by the Indians with some excellent salmon, and returned the compliment by a present of beads and tobacco. Temperature, 95°.

July 29, 1884.—The weather all day was warm and pleasant, but it was so cloudy at noon that I could not get an observation. The Indians who accompanied us had taken up their residence on this beach for all summer apparently, as they had constructed a number of houses by weaving together the supple willow boughs in basket fashion and covering them with skins and old pieces

of cotton cloth. At 7 a. m. we bade good-bye to them (after distributing some tobacco) and started on our way. The scene on the beach was one of life and spirit. The men were all grouped together near the center hut and were waving their arms and shouting vociferously to our two Indians, who did not lose an opportunity of shouting quite as lustily in reply.

The women, in frail canoes, were running out their nets or hauling them up on the gravel beach alive with the gleaming white fish, salmon and trout; and as we whirled past them one of their number seized a struggling king salmon by the tail and by a dextrous movement twirled it high in the air and it fell struggling and flopping into our boat. This feat was greeted with a tremendous "kay" of approval, and the sound of their shouts could be heard long after a bend in the river hid them from our view. All day we sped down the river, stopping only once to boil a pot of tea and then on again at break-neck speed. Where we had avoided the current in coming up we now sought its aid. In the swirls and eddies of deep pools the light skin boat was sometimes unmanageable, but we escaped any serious injury. About 2 p. m. we were running through a narrow and deep slough of the river when suddenly the boat was caught in an eddy and hurled with great violence against a steep bank. All of us were unseated by the shock and the midship thwart was displaced. An examination disclosed no serious damage, however, and we proceeded. I examined the mouth of the Notmoktowoak or "Pack" River, a branch of the Kowak, which drains the country between the Noatok and the latter stream, and passed through two sloughs which I had not seen in coming up. The character of the shores remained the same throughout the day. Steep black banks from twenty to thirty feet high, and occasionally a jutting point of fine mica and gravel, show that underneath this layer of mold there is a substratum of sand and, I think, clay. The boat leaked considerably during the afternoon and at 8 p. m., when opposite the Indian village at which we first camped in coming up, I resolved to stop and have a look at her. We hauled her out, but Andre could not find any fresh leaks, although she was thoroughly saturated and filled with sand and needed a good drying in order to make her tight. Accordingly I concluded to stop here until the next night, when she would be in good condition again. Average temperature, 95°.

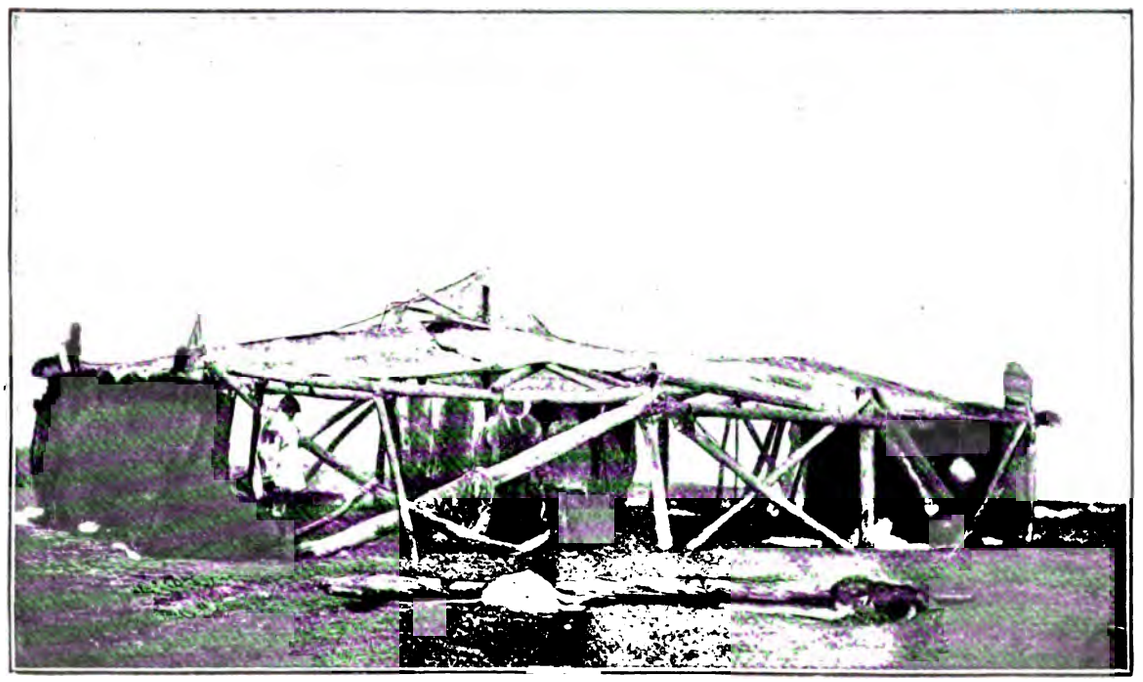
July 30, 1884.—Light northeast breeze with clear, warm weather throughout the day. This morning we discovered that during the night a long seam in the stem of the boat had opened and I sent across the river for an Indian woman to repair it. This job would occupy some time, and as the boat needed a day's drying I resolved to seize the opportunity of visiting the Jade Mountain, which is about twelve miles distant from this place. Accordingly at 9 30 a. m. I started, accompanied by Andre and Natorak. The other Indians of our party refused to go, as they said that their shaman had declared the devil in the mountains would surely catch them if they went on any such excursion. Our walk across to the mountains was attended by excessive fatigue. Our way lay across the soft, yielding tundra through lagoons, around lakes and dense thickets of tangled willows and cottonwood, and long stretches of pine woods, where fallen trees caused us constantly to turn aside and travel by a circuitous route. At one moment exposed to the burning heat of the summer sun, and the next floundering, plunging, and struggling waist-deep in dark pools of stagnant water where the light of day never penetrates, we reached at last the banks of a roaring torrent which sweeps around the base of the Jade Mountain and separates it from a high rugged peak of the same range. The bed of the stream was filled with stones, and huge heaps of them had been piled up with human-like intention by the ice. Andre and I began at once our search for the green stone, but the heart of Natorak failed him here and he could not be induced to go any nearer to the supposed residence of his satanic majesty. We left him to make the camp fire and cook the supper, while we took our way further up-stream. Large quantities of green stone were found in the bed of the stream and scattered along its banks. The whole mountain seems to be composed of it, and the sides of the cliffs are like polished glass, so smooth have they been made by pressure or friction. Following the course of the stream we collected a number of specimens of stone aggregating in weight about seventy-five or one hundred pounds and returned to the camp, when we divided our specimens into three packs convenient for carrying, and as it was by this time about 11 p. m., we drank a cup of tea and lay down by the fire to snatch a few hours' sleep prior to our return. Average temperature, 90°.

July 31, 1884.—At 3.30 a. m., as the first faint gleams of light appeared in the sky, Andre awoke me from a deep sleep and suggested that we start as soon as possible for our camp on the river before the heat of the day set in. Natorak had already made some tea and baked some bread on a stick, and after partaking of this limited refreshment we started on our return. The air was cold at this time of day, and for this reason the mosquitoes did not trouble us much. I found myself very stiff and sore after the walk of the day before, but this soon wore off and we started down the side of the mountain at a famous rate. Each of us had quite a load of stone, and in addition to this, Andre had the whole of the camp outfit dangling from his belt or strapped to his shoulders. Even with this tremendous load he frolicked around like a young colt turned to pasture, sometimes disappearing as he followed the track of a bear down some mountain ravine and then bursting through a thicket a mile away and rushing down towards us with the numerous articles of his pack dangling and clattering in the wind. His high spirits were infectious and I forgot my fatigue and walked along quite well for about five miles, when we reached the edge of a dense forest of pines and plunged into its dismal recesses. Here we were beset by myriads of mosquitoes and sand-flies, which attacked us with a persistence and violence utterly beyond description. Sometimes in crossing a morass I would be compelled to steady myself by holding on to the limbs of a fallen tree. At such times the horrible pests would attack my face, neck, and head with venomous force which no pen can describe. After about two hours of this kind of work we emerged upon the open tundra, and a fresh breeze springing up we threw ourselves down and buried our heads in the yielding moss and grass until the wind had blown the mosquitoes away. I can not tell how much I suffered during this day. I only know that when we reached the river at 5 p. m. I was almost insensible from pain and exhaustion. Our boots were worn through, and Andre had to tie pieces of blanket around my feet to protect them. Despite this precaution they were cut and bruised and so much swollen that he had to cut the boots to get them off. When we reached the river I was informed that Lieutenant Stoney, U. S. N., had passed up and had left a note, kindly offering me any assistance he might be able to render our party. Finding myself too exhausted to go any further at present, I dispatched a note to Mr. McLenegan, requesting him to bring forward the launch with all possible speed. The shaman of the village opposite our encampment volunteered to act as guide for the launch, and I sent him down with instructions to stand in the launch's bow and point out the best channel for Mr. McLenegan. These arrangements having been completed, I turned in to sleep and did not awake until next day near noon.

August 1, 1884.—We were at work all day making preparations for the arrival of the launch and for an immediate start up the river. The skin boat had had two days' good drying and a thorough overhauling by the Indians of the village. The shaman, who had been opposed to our mountain trip, and whose influence had prevented others from helping us, now came forward and tendered his assistance to us. He promised to go back with us up the river and prevail upon the Indians to help us. All the pay he desired was a little something to eat and to be allowed the privilege of making the trip in the steam-launch. The water in the river was rapidly falling, and the current decreasing, so that everything seemed propitious for our expedition. We went up a slough of the river and rafted down some wood suitable for the launch to burn, and by night we had cut sufficient to last her two days. At 10 p. m. the shaman was seen paddling towards our camp at a rapid rate, and I felt sure something had gone wrong. He brought a note from Mr. McLenegan saying that the fireman had let the water run down in the boiler, and had burnt the tubes, how seriously he could only tell after an examination, which he would make immediately. I sent word down asking Mr. McLenegan to inform me at once of the extent of the damage, intending to start right away in the skin boat and allow him to overtake me should the injury prove such as could be repaired. By this means we could cut wood at convenient distances, and thus avoid the necessity of stopping the launch for this purpose.

August 2, 1884.—All the morning we looked anxiously down the river for the appearance of the launch, but she did not come. Toward 12 o'clock we discovered a canoe about a mile off

KOWAK RIVER NATIVE.



INDIAN KESHAGEM. (DANCE-HOUSE.)

coming towards us at a rapid rate, and in a short while our messenger of the night before handed me the following note from Mr. McLenegan:

"AUGUST 2, 1884.

"DEAR CANTWELL: I worked all last night on the tubes, and have had to plug six of them. They are now comparatively tight, but it diminishes our draught so much that it is almost impossible to keep steam enough to overcome the current. I just took out two grate-bars, which helps somewhat, but at this rate I doubt whether we will be able to reach you to-day. As near as I can learn from the boy your boat is not disabled, and if such is the case, can't you meet us? This will ruin the boiler completely and cut off means of reaching the coast if I try her much more; but in obedience to orders I will keep on as fast as possible, or until something else turns up. Awaiting some instructions, I am,

"Yours, etc., "S. B. MCLENEGAN."

In answer to this dispatch I immediately sent word to Mr. McLenegan to stop and await our arrival. We packed the skin boat and soon after 12 o'clock started down the river with four Indians and myself paddling. At about 3 p. m. we arrived at the place where Mr. McLenegan had stopped the launch, and I had a consultation with him as to my plans for gaining the head of the river. So far as the launch was concerned I found she was scarcely in condition to go *down* stream, and it would be useless waste of time to attempt to make her stem the current. I saw with alarm the rapidly falling river, and knowing the many shoal places and rapids below our present position, I considered it best to make our way back to the mouth of the river while we yet had time enough to do so in safety. After dinner we started down stream, but made very poor headway, as the steam, although allowed to run up to sixty pounds, would drop almost immediately to twenty-five pounds when the engine was started. Finding after repeated experiments that the steam would be of no service to us we gave it up and got out the oars and tried to keep her in mid-channel by this means. This was not always possible and we often grounded on sand-bars and had hard work to get her off. At midnight we reached the Indian village where I had left the launch, and as none of us had had a moment's sleep for forty-eight hours we turned in as best we might, wet and hungry, but too tired to care for anything but rest and sleep.

August 3, 1884.—We spent the day in overhauling and restowing everything. Mr. McLenegan with Lewis was at work all day, and at night he reported that he had given the tubes a thorough examination and was satisfied they would not work with wood as fuel. Our only hope for steam was, in his opinion, to get coal, and try that. A bear was killed and brought to the outskirts of the village to-day, and the whole population prepared for a feast to which we were invited, and which we enjoyed most heartily, as we were sadly in want of meat. The appetites of these Indians are something marvelous, and when I spoke to Andre about it, he told me that the Indians of the Tannenah region far surpassed these in ability to eat large quantities of food at one time. He instanced the case of an acquaintance who had eaten the entire carcass of a deer at one sitting. It may, however, be stated that this gastronomical feat was accomplished only after an entire night's steady application. My personal observation of these natives leads me to believe that while it is true that they can consume large quantities of food when it is plentiful, they are also capable of going without food for much longer periods than the *average* white man. I made some very good astronomical observations, as the sun was out the greater portion of the day. During the afternoon Andre cooked a quantity of bread so that we might not be delayed unnecessarily on our way down. I intend to make the trip as quickly as possible in order to reach Selawik Lake in time to explore it.

August 4, 1884.—A heavy rain-storm set in about 3 o'clock this morning, and it was not until 8 a. m. that we could remove our provisions to the boats and make a start. We now settled ourselves steadily to the oars, knowing that the 225 miles of river before us must be traversed in that way. Although the launch had a sail, it was not of much use to us in the river on account of its tortuous course. The natives had so thoroughly gorged themselves the day before that fishing was suspended for the time being, and we could not procure any fresh fish to take with us. The journey down stream was found very dangerous on account of the great number of

shoals in the stream in this locality. We got on them many times during the day, and the launch was only saved from capsizing or running out too far for us to get her afloat by all hands plunging overboard and bearing her bodily against the current into deep water. At 4 p. m. we ran the rapids above the village visited July 18. Here we ceased pulling and allowed her to drift with the current, and it was really alarming to see with what velocity we were whirled along past the crumbling banks and over the rocky shoals. In ten minutes, however, we were through this bad place and took to our oars with considerably more heart and spirit, feeling that the prospect of getting the launch back to the coast was much improved. The wind was ahead all the afternoon, and seemed to draw ahead in every reach. It served, however, to keep us comparatively free from mosquitoes, for which we were duly thankful. At 7.30 p. m. we pitched our camp on the side of a rocky cañon about six miles from the Indian village visited July 18, and upon reckoning up the distance, I found we had gone nearly fifty miles this day, and as the oars were of little use except to keep the launch in mid-channel, some idea of the force of the current can be obtained. Temperature, 90°.

August 5, 1884.—The day dawned clear and continued so throughout. At 7.30 a. m. we got under way and proceeded down the river, and at 9.30 a. m. arrived off the second village passed in coming up, but did not stop, as I was anxious to reach the other village before noon in order to correct some observations previously made there. We found the current very strong, and were obliged to go around an island by a way we did not discover in passing up, in order to avoid a shoal place in the larger part of the river. At 11.30 a. m. we arrived at the first village, and I got several observations for latitude, longitude, variation, etc. We obtained a good supply of fresh fish and salted them down for future use. The Indians had caught an unusually large quantity of fish at this village, and the racks on the beach were covered with drying salmon. At 1 p. m. we again started on our way, and at 2 p. m. arrived at the rapids above the coal mountain. The water had fallen some ten feet since we passed up, and I now discovered that the bed of the river was filled with many gravel shoals, and that from the east bank many ugly rocks projected into the channel. In seeking to avoid these latter the launch ran hard on to one of the shoals and we had difficult work getting her off. Fortunately a fresh breeze sprung up ahead just at this time, and we hoisted our sail, and by tacking her through the narrow sloughs managed to shoot the rapids without further accident. We now emerged into the still part of the rapids mentioned before, and found very little current to aid us for about ten miles. I determined to run all night, as there are no shoals in this part of the river. During the afternoon we arrived at the place where we had cached the skiff, and stopped long enough to get a cup of tea and take her in tow. As night came on the river became strangely silent, and as we sped quietly past the dark banks there was no sound to show that we were moving. Only the murmuring of the rapidly flowing current as it raced over the limbs of some tree which had fallen into the water, or the sudden noise of a portion of the high bank breaking away and tumbling into the stream, broke the solemn stillness. The darkness increased, and a light mist settled upon the river as the hours wore on, and I would have stopped about midnight had not the moon suddenly appeared above the high wooded shores and flooded the river with its silvery light. At 12 o'clock we passed the mouth of the Sheeleelictok and discovered a large shoal in the river at this place. We had arranged to pass the night in watches, but the mosquitoes were so bad that it was impossible to sleep, and so we sat up all night smoking and fighting these pests. Average temperature, 95°.

August 6, 1884.—At 2 a. m. we arrived at Highland Encampment, and stopped long enough to take on board some stones we had collected as specimens on our way up. Just below this place the river widens to 1,100 yards, and the current decreases somewhat. About 4 a. m. a light breeze sprang up, and we went along a little faster than the current until 5.30 a. m., when we arrived at some high bluffs in a bend of the river a short distance above Lost Anchor Encampment. Here we stopped for breakfast, and I got some sights for longitude and latitude. After getting my noon observation we started again down stream, making good time, as we were assisted by a light breeze. The banks in this locality are perpendicular masses of black mud and decaying vegetable matter, broken into many irregularities by the action of the current. At 9 a. m. we arrived at Glacier Bend, and I made several sketches of this remarkable formation. We shot a beautiful specimen of gull common to this region as it fluttered along the face of the

ESKIMO GRAVE, HOTHAM INLET.

bluff, and upon landing to procure our prize we found the soil to be composed of an exceedingly fine dust, which had been fashioned into many curious designs by the percolation of water from the melting ice above. The many fantastic shapes seen here reminded me of the Pictured Rocks of Lake Superior. At midnight we reached our camp where we had left the coal, and as Mr. McLenegan wished to overhaul the boiler before starting fires with coal I decided to remain here until morning.

August 7, 1884.—At 7 a. m. we resumed our journey, and at 10 o'clock reached the settlement which Lieutenant Stoney named Gilderville. Here we commenced steaming, as there was very little if any current to aid us. The banks of the river are low and covered with a dense growth of swamp trees and rank grass, with very little timber, and this entirely disappears as we approach the delta. Towards 7 o'clock we found ourselves ten or fifteen miles from the mouth of the river, and, choosing a passage which we had not previously seen, passed on toward the inlet, finding from two to three fathoms of water in the river; but the mouth was closed by an extensive shoal, and we could not find more than three feet over it. Our coal lasted to this point, and by mixing a little wood with it we managed to keep enough steam to cross the bay and reach the opposite shore, where we camped. Observed the schooner *Ounalaska* lying at anchor about eight miles to the westward.

August 8, 1884.—We were at work all day in numerous small jobs about the launch and skin boat, preparatory to a trip to Selawik Lake, which I intend to visit after making a rough survey of the mouths of the Kowak. Our camp was situated at the base of some bluffs, and from their tops we had a good view of the delta opposite. The low, flat country extends as far as the eye can reach to the northeast, and is covered with a thick growth of low willow trees and rank grass. Many lakes and lagoons could be seen, and the different passages from the main river to the inlet seemed almost countless. The bay is almost two and a half miles wide at this place, but it grows wider to the westward, and in some places is eight miles across.

August 9, 1884.—During the day we had a brisk wind from the westward, and I employed the time in running along the western shore of the bay, sounding and exploring the many mouths of the Kowak. The main stream empties into the bay just at the entrance of Selawik Lake, which is nothing more than an extension of Hotham Inlet. In fact it is hard to determine where the inlet ends and the lake begins on the north side, but on the opposite side the entrance to the lake is well marked by a sand spit, which projects far out from the land and divides the two bodies of water very plainly. At night we ran across to this spit, and, seeking a sheltered spot, camped. A convenient little harbor here determined me to leave the launch at this place and to make the trip in the skin boat, as I was informed that much of the upper portion of Selawik Lake was shoal.

August 10, 1884.—At 6 o'clock I started up the lake accompanied by Andre and Natorak. We had a fresh wind from the westward and the light skin boat flew over the sparkling waves like a race-horse. In an hour's time we reached the beach at the foot of a high bluff visible from the camp, and I established a station here and erected a beacon. After taking bearings of some prominent peaks and points around the end of the lake I proceeded along the south shore, finding from two to three fathoms of water with gradually shoaling water to the beach. The country is the usual high rolling tundra land of the lower part of the bay and forms a bluff bank to the lake. Along the front of the bank it is covered with a thick growth of willow and birch, except where the ice and snow have slipped down from the heights, leaving a scarred and rugged track behind. A narrow strip of beach composed of white sand and gravel extends for miles along the eastern side of the lake, and at intervals long spits extend far out from the shore, so that many little bays are formed. We made several stops during the day in order that I might get observations and bearings. At each stop Andre and Natorak erected beacons of drift-wood found on the beach, to assist me in the work of surveying. Towards 5 p. m. we reached a part of the lake where the shore trends to the northwest, and here we found the water very shoal and the shores low and swampy. Two hundred yards from the beach a bar extended to the northwest parallel to the shore and a heavy sea was running on it. Our light boat would not beat to windward, so I determined to land here and wait until the wind changed, or the sea should go down sufficiently for us to paddle. We got over the bar comparatively dry and camped on the marsh. The place was alive with geese and ducks, and Andre killed enough in a very short while to last us a week.

We slept under the boat, and as the wind continued blowing all night we were not troubled with mosquitoes. Made 53½ miles during the day.

August 11, 1884.—This morning the wind had shifted to the southwest and was blowing a gale on shore. We could not get away until 10.30 a. m., but once over the bar and in deep water we sped before the wind at a famous rate. The shores continued low and marshy, and at 12 o'clock I observed a small river running in from the eastward. Upon inquiry I learned that a large lake could be reached by going up this river, and as I knew no such lake was on the charts of this country I resolved to explore it. We entered the river and found it to be about seventy-five yards wide, and with two to three fathoms of water. At 2 p. m. we reached a beautiful little lake about five miles in diameter and almost entirely surrounded by mountains. Dashing across this lovely little sheet of water we entered a narrow creek which flows in on the opposite side, and soon after stopped for dinner at the hut of an Indian living on the banks of a lagoon near by. He and his family were greatly surprised to see a white man here, but they treated us very hospitably by giving us some fresh fish and delicious salmon berries, which grew in great abundance on the tundra adjacent to the lake. At 2 p. m. we left, after giving our host some tobacco, and in an hour's time emerged on the large lake of which we were in search. The Indians call it Emogarik-choit, or Little Sea, and the river which connects it with Selawik Lake, Kiactuk, or Fox River. The mountains which are visible from Selawik Lake border the eastern side of this lake, and extend around about three-quarters of its circumference, and then gradually recede, and the shores of the lake trending to the northward gradually grow lower and lower until at last there is nothing left but a low marsh, which is no doubt frequently submerged. I found the soundings quite regular, there being about one fathom all over except around a low marshy island lying in the southeast part of the lake. Here there was scarcely water enough in some places to float our boat. At 7.30 p. m. we camped on the marsh at the head of the lake, but the shore was composed of a soft black deposit of a silt-like character, of the consistency of mush, and we were compelled to drag the boat through this for a quarter of a mile before we could find a place high enough to make a camp upon. In a short while Natorak had a fire blazing and Andre had prepared our supper. We made 43 miles this day. Average temperature, 90°.

August 12, 1884.—The wind blew strong on shore all day and we could not get away from this place. To add to our discomfort the water gradually overflowed the low land and soon saturated the hummock of land on which our camp was made so that we were compelled to "lay on our oars" in a literal as well as a metaphorical sense. I spent the day in working on the track of a rough chart which I had been making as we proceeded, and in teaching Andre to write. I wanted Natorak also to learn, but he evidently did not relish the idea of exchanging his blissful ignorance for a more enlightened state of mind, and my efforts in this direction were not successful to any appreciable extent. I observed a slight rise and fall of the tide to-day and am inclined to think there is a range of about six inches on the average, but this will vary greatly according to the force and direction of the wind. Average temperature, 95°.

August 13, 1884.—The day commenced with a strong southwest wind, which moderated sufficiently by 5 a. m. to allow us to launch our boat and proceed. We at first attempted to sail, but the wind drew right on the beach, and so I put Andre and Natorak on the shore and they towed the boat until we could lay our course under sail. At noon we stopped on the north side of the lake for our mid-day meal and observation. At 1 p. m. we got away again after having dined sumptuously on roast duck and bread baked on a stick. The wind being now fair we sped away along the edge of the lake until 5 p. m., when I observed a deep indentation on the shore, and upon inquiry learned that a small stream connected the lake at this point with Selawik River about twenty-five miles from its mouth. Finding that two days would suffice to reach Selawik Lake by this route, I turned the boat's head in this direction. After an hour's run we reached the farthest side of the little bay, which we found very shoal and the bottom covered with grass. The place seemed alive with fish, and shoals of them played around and under our boat without the slightest evidence of fear. A blow of the paddle upon the water would cause a terrible commotion for a moment, but they seemed to enjoy the sport as much as we did. The entrance to the river, which is called the Eegyak or Throat River, is concealed and could be easily passed by one unacquainted with the country. Natorak piloted us into it, however, and we found ourselves between banks

LOWER END OF SELAWIK LAKE.

densely clothed with the characteristic willow trees and grass of the lowlands hereabout. A slight current favored us, and with a smart breeze which followed the course of the river we rushed along at the rate of seven knots. No shoals were seen, and the depth of the water was from three to five fathoms. In common with all these rivers the course of the Eegyak is tortuous, and its shores afford but little scope for scenic description. At about 8 o'clock p. m. we arrived at an Indian settlement situated at the junction of the main stream with a smaller one flowing off to the left, and here pitched our camp, having made 35.2 miles during the day. The Indians were exceedingly kind and anxious to help us. They rushed into the water waist deep and hauled the boat up with all on board high and dry amidst great excitement, and after building a fire and getting enough wood to last us through the night, sat down around us and smiled on us with great good humor. I learned to-day that the natives of this region in summer time travel in their skin boats from the headwaters of the Selawik through a small stream into the Kuryukuk and into the Yukon with one short portage, and it is probably by this route that Lieutenant Zagoskin, of the Russian navy, attempted to make a passage about forty-four years ago. This officer reached the head of the Selawik River, but for some reason did not succeed in making the portage.

August 14, 1884.—At 7.30 we bade farewell to our kind Indian friends and proceeded on our voyage. Seven miles now brought us to the junction of the Eegyak with the Selawik River. Here we were confronted with a head-wind, compelling us to take to the oars. The banks of the Selawik vary but little from those of the Kowak in character, with the exception that the undergrowth is heavier. The width of the river varies from six hundred to a thousand yards, and in some places it expands into bays a mile wide. From four to six fathoms of water were found in the channel. From the mouth of the Eegyak the Selawik trends in a northwesterly direction about six miles and then to the south and west to the lake. Many small lakes and lagoons were observed near the river, and entering one of these I discovered an extensive sheet of water lying at the foot of the mountains, about six miles from the river. At 4 p. m. we emerged into a large bay filled with many islands, and the glistening waters of Selawik Lake could be seen about four miles ahead. We crossed the bay and at 5.30 p. m. reached the sand-spit forming the north side of the entrance to the lake. Here we camped, as there was too much sea in the lake for us to go farther. The wind was strong from the southwest all day and we made 25.7 miles. Average temperature, 85°.

August 15, 1884.—This morning the wind had gone down and the sea in the lake was decreasing, so that we got away shortly after I took my noon observation. We kept close along the north shore, and I put Andre and Natorak on the beach with a tow-line. The beach is like that on the other side of the lake, composed of sand and gravel, and the shores are generally high, with occasional steep bluffs of sand and clay. At a point about one-half the distance from the mouth of the Selawik River to the southern entrance to the lake a river runs in from the mountains which separate the Kowak and Selawik Rivers. Here the country is low and marshy, similar to the Kowak delta. Berries grow in great abundance along the sides of the bluffs and on the level tundra land, and game is exceedingly plentiful. I shot during the afternoon eight ptarmigan, one goose, a loon, and an Arctic hare, and could have shot many more of each of the birds mentioned had we needed them. At 7.30 we stopped for supper, but did not camp as there were signs of a shift of the wind to the northeast during the night and I was anxious to reach the launch as soon as possible. At 10 p. m. the wind came fair and we started. Soon we got from beneath the high bluffs and the wind caught our little sail, sending us spinning over the sparkling waters of the lake and on toward the launch, some twenty miles away. The soft rays of the moon bathed lake, plain, and distant mountains in a flood of silvery light, and the air was filled with sweet perfume wafted to us from the rich tundra plains. At intervals the long mournful note of the loon, sounding strangely like the sobbing of a child, or the low discordant cry of the crane, startled us in our reveries. As we receded from the land these sounds were lost and only the rushing of the water as it was parted at the bows was heard. At 12 o'clock I relinquished the helm to Andre and rolled up in my blankets for a sleep. Distance made during the day, 33.5 miles.

August 16, 1884.—At 3.15 a. m. we arrived at our camp at the entrance of the lake and found all hands well, but tired of their week's idleness, and anxious to get away. At 10 a. m. the wind increased so much that I moved the boats around on the other side of the spit, and found a

comfortable berth for them safe from the sea, which now thundered on the opposite or lake side of the point. The morning was spent in preparation for our voyage down Hotham Inlet. I got observations and bearings of prominent points in the neighborhood to assist me in the preparation of a chart, and swung the launch to find the error of the compass. At 4 p. m., everything being in readiness, we got under way and started down the bay having a two-and-a-half-knot current to assist us. Toward 6 o'clock a light breeze from the eastward sprang up and we increased our speed to four knots per hour. The skin boat, with Andre and Natorak as captain and crew, kept steadily ahead of us. At 8 p. m. we stopped for supper on the east side of the bay, and Andre started a fire on the edge of a huge pile of drift-wood which burned like tinder, and a regular conflagration ensued. The flames rushed upward with a mighty roar a distance of thirty feet, and the bushes in the vicinity were shrivelled with the heat. When Andre announced supper I could not help being reminded of the fabled mountain in labor, for a little muddy coffee and burnt flour were all his tremendous fire produced. We started again a 9 o'clock, following the west shore down, and looking for the mouth of a river which flows into the inlet from a small lake in the interior of Choris Peninsula, intending to make a harbor there for the night, but owing to the darkness we passed without discovering it, and at 12 o'clock we camped on the beach just where it begins to make to the westward, having gone 33.5 miles since morning.

August 17, 1884.—The day was spent in laying off a base-line on the beach two miles in length for the purpose of fixing the position of the principal mouths of the river and prominent points of the bay visible from this place. During the afternoon the wind, which had been light during the forenoon, increased to a fresh breeze, and a heavy sea began rolling in on the beach. I feared the launch would drag her stone anchor and go ashore during the night, and at 5 o'clock I took Wilbur, and we started to look for the river about eight miles up the inlet in order to get a safe place to lie. We discovered the entrance at about 6 p. m., but in attempting to run in got aground on a shoal which is formed by the current and had hard work getting her off without help. We finally succeeded in getting her into deep water and made a tack to clear the shoal, and then made another attempt. The wind steadily increased, and we did not dare run any risks, so that darkness overtook us before we could gain the refuge of the river, and we were compelled to anchor under the lee of the shoal, where we lay comparatively sheltered from the sea. The wind blew so strong, however, that Wilbur and I stood "watch-and-watch" through the night.

August 18, 1884.—At 4 a. m. Wilbur and I got the launch under way and stood back toward our camp, arriving there at 8.30 a. m. After having breakfast, we broke camp and stood to the westward along the shore, making but slow headway, as the wind now died away, leaving the surface of the bay as smooth as glass. We stopped for a rest at noon, as we had been pulling at the oars without ceasing since morning. After getting a cup of tea we started again, and as a light northwest wind had sprung up, we stood across the bay towards the delta of the Kowak, sounding constantly. At 6.30 we arrived opposite the mouth of the river which we entered in going up and came to near by for supper. A boat-load of Indians came up to our camp from below, and from them I learned that the *Corwin* was expected to return to Cape Blossom in a day or two, as she had been seen at Chamisso Island about the 16th instant. At 9 o'clock a moderate breeze sprang up from the northward, and we got under way to make the most of it; shaped course west-southwest, which just clears a long point projecting into the bay from the south shore, and arranged the party in watches for the night. At 12 changed course to northwest by north. Distance made during the day, thirty-seven miles. Average temperature, 85°.

August 19, 1884.—After 12 o'clock the weather clouded over and the wind increased to a fresh breeze. At 2 a. m. rounded a point of land projecting into the bay from Choris Peninsula, and shaped our course for Encampment No. 2, where we had cached some pemmican and potatoes. At daybreak the wind died away entirely, and we took to our oars. Arrived at our old camp at 10.30, and found our cache undisturbed; but the two cans of desiccated potatoes were found upon examination to be unfit for use, and I decided not to take them. As it was dead calm on the bay, I delayed here to allow all hands a chance to get a little sleep. At 2 a. m. a light, favorable breeze sprang up, and we got under way and stood toward the entrance to the inlet. At 4 a. m. we passed the fifteenth mouth of the Kowak, which flows into Hotham Inlet nearly opposite the entrance. Toward 8 o'clock we headed in for some high bluffs forming the south side of the bay, and discov-

ered an extensive shoal making out into the inlet from this point. Communicated with party of Indians, who informed us that the *Corwin* had been at Cape Blossom, but had left for Point Hope this morning. The wind continued light and baffling all night, and we made very little headway. Distance made during the day, thirty-eight miles. Average temperature, 85°.

August 20, 1884.—The light wind continued until 4 a. m., when it shifted to the northwest and commenced blowing hard. Soon we rounded the bluff headland of Hotham Inlet and stood for the site of our first encampment. The Indians of the trading village who had witnessed our approach were gathered on the beach to receive us, and when we landed and began pitching our camp they were exceedingly troublesome in a harmless way, examining everything brought on shore, trying the axes, lifting the boxes, opening everything that could be opened, and, in general, making themselves excessively familiar. We allowed them to do pretty much as they pleased, as it would have been folly to resist them, and we got along very well until breakfast. I thought we would have some rest then at least, and we retired to our tent and closed the flap before beginning to eat. This maneuver nonplused them for a moment, but soon a dirty-faced rascal thrust his head through the opening and surveyed us with a grin of delight. The flap was hauled over rather roughly by one of our party, and the Indian retired precipitately. We had begun to imagine that question settled when a sudden rush was heard, and the whole front of the tent was thrust aside by a dozen natives, who crowded in and sat down around us, all in the best of spirits seemingly, and, beyond this determination to see us eat, quite undemonstrative. Andre advised me to refrain from any show of impatience, as the curiosity of the natives would soon become satisfied and they would leave us. When we proposed to retire, I was gratified to see a general move on the part of the Indians to leave us to ourselves, and soon not one could be seen within a mile of the camp. We had fine weather to-day, and I had the launch scrubbed and all bedding aired. Distance made, ten miles. Average temperature, 85°.

August 21, 1884.—To-day I found some coal which had been sent on shore from the *Corwin*, together with a letter from Captain Healy directing me to ascertain particulars as to the numbers of the Indians who annually make this spot a rendezvous for trade, and to examine the shoal lying off the inlet with a view of discovering a channel to the sea. I visited the village after dinner and counted nearly six hundred natives. I was informed that as many had gone back to their homes.

From the middle of July to the latter part of August the natives of the Nöitoc, Kowak, and Selawick Rivers meet those from Cape Prince of Wales, Diomedes, and Point Hope for the purpose of trade. The beginning of the season is celebrated by dancing, feasting, and story-telling, which occupy one day, and after that is accomplished the real business of the occasion is prosecuted with surprising tact and ability. In this community of uncivilized beings the same methods of business are adopted whereby prices and values are made to vary in proportion to the demand as are used by their more enlightened brothers in the civilized world. Rifles are always in demand, and next to whisky obtain the readiest sale. The chief of the Prince of Wales Eskimos is probably the most powerful magnate of this region, owing no doubt to the fact that his settlement is a convenient stopping place for vessels having these articles of contraband trade on board. His method of becoming rich is simple and effective. Upon the opening of business he offers the Indians whisky in exchange for rifles, and will not trade for anything else, and is generally successful in obtaining a "corner" in rifles in this way. I was informed that it was not an unusual thing for an Indian to sell and buy his rifle twice or three times in this way during one season, or as long as the whisky lasted. It is gratifying to learn that whisky as an article of commerce is becoming scarcer every year. It is exceedingly difficult to obtain any reliable information as regards the number or amount of anything. Generally speaking, the native system of notation is limited to the fingers and toes, and any very large number is expressed by a handful of sand. The village consists of a straggling line of tents along the beach. Some were composed of a number of poles arranged in a conical fashion and covered with deer-skins; others of blue, white, or red drilling were seen, and one more gaudy than the rest was covered with the remnants of a cheap bed-quilt, on which was printed in glaring colors the picture of a man sitting up in bed with a candle in one hand and a fifteen puzzle in the other. The tents of the "omaliks" are generally more imposing affairs, made in the United States and brought here by the traders. The chief of the Kotzebue Sound Eskimos, who took a violent fancy to me, acted as my guide through the village, and upon arriving at his tent invited

me inside. Upon entering we sat down on the soft skins covering the ground, and lighting our pipes smoked and smiled at each other with great complacency. I did not feel quite so contented, however, when his wife placed before us a dish of white whale blubber for our refreshment. I chose a delicate looking morsel and put it in my mouth. It tasted like solidified codfish oil might taste, and I declined any more, giving as my excuse a late and hearty dinner. We were followed through the village by great crowds of men, women, children, and dogs, who kept up a continual howling and hustled each other about in great good humor. Huge bear, wolf, and deer skins were thrown on the ground for me to walk over, and when I returned to my camp the little boys ran ahead and picked berries for me to eat.

August 22, 1884.—The excitement resulting from our arrival had evidently died out this morning, for the Indians did not attend in such large numbers as yesterday. After breakfast I took the launch, and with Wilbur, Andre, and a native who lives here, went out to the bar searching for the channel across the shoals. After sailing backwards and forwards for about five hours I could not discover any deeper channel than one fathom across the bar. There are many small sloughs leading from the deep water inside, but all those I examined ended in shoal water before reaching the sea. It is probable that the channel is subject to many changes from the effects of ice and wind. Inside the bar a deep channel, with from four to eight fathoms, runs along close to the beach north by west to the point of land south of the village, thence north-northwest to a remarkable bluff headland, forming the right side of the entrance to Hotham Inlet. There is no channel into Hotham Inlet on the north side. There is good water along the north side as far as the mouth of the Nöitoc, but here it ends, and a large shoal prevents boats from passing through the inlet by this route. When we returned to our camp I learned that ten large boats had arrived from Cape Prince of Wales and two from Point Hope. I visited the village after dinner, and found the whole place in an uproar of excitement. Tents were being pitched, boats hauled out and converted into houses, skins and trade goods thrown together in large piles, and above all the noise and bustle the howling of three or four hundred dogs tended to increase the Babel-like confusion. When I arrived there was a momentary lull in the proceedings. Many of the natives had seen me on the *Corwin* and recognized me now. They crowded around me, and were evidently anxious to know the cause of my presence. Upon being assured that I did not come with any malign intentions they welcomed me with every evidence of joy, and kept me hemmed in until one or two drunken Eskimos had been hustled out of sight, and then resumed their preparations for trade, allowing me to go wherever I pleased. I was followed by a mob of boys, who showed the same propensity for mischief as the small white boy does on similar occasions. After taking a rapid census of the population, which I estimated at about fourteen hundred, I returned to our camp.

August 23, 1884.—Soon after breakfast this morning an Indian ran across the fields and informed us that the natives of the different settlements were about to celebrate the arrival of the Cape Prince of Wales chief by having a dance, and wanted me to be present. I immediately started with Andre, and in a short while the tent of the Kotzebue Sound chief was reached. After partaking rather gingerly of some seal meat which he offered us we started together for the scene of the dance. Upon a level plot of ground a short distance from the village about twelve hundred natives were gathered, and the sound of the drums and the howling chant of the singers announced the fact that the ball had opened. On our approach the crowd around the dancers fell back and allowed us to pass through to a spot favorable for observation. Within the circle some half dozen Indians, dressed in fancifully-trimmed parkas and wearing highly-ornamented gloves and boots, were going through the most astonishing contortions, sometimes leaping high into the air and doubling themselves up with head, hands, and feet all in a bunch, or standing in one place, swaying to and fro, and making spasmodic gestures, with their hands clinched and necks stiffened to a rigidity that was appalling. With horrible grimaces they glared around at the crowd, in every action keeping time with the musicians, who were ranged in a line behind them. The musicians kept up a continual beating on their drums, accompanied by a chanting song, the words of which were indistinguishable. I was informed that on such occasions the words of the song are extemporaneous, generally relating to the business for which they are gathered together, but that, when wrods or ideas fail them, they get along fully as well by repeat-

ESKIMO WOMAN, SHOWING LABRET OR LIP ORNAMENT.

ing over and over the "Hung-Hi-Hung-A-Hung-A-A-A," which seems to contain all the elements necessary to arouse the dancers to a pitch of frenzy. After the dancers from the different settlements had performed a general dance took place in which the women joined, and the whole assemblage, as if to do honor to the fair sex, joined in the chorus. Several drunken natives forced themselves through the crowd and ran wildly around the open space, but they were speedily ejected. As the dance proceeded the number of drunken men increased so much that our friend, the chief, advised us to leave, which we did, not, however, before a brawny, half-naked Eskimo from Point Hope had burst through the crowd and, in the ardor of his affection, flung himself on me and buried his bushy head on my breast, at the same time imploring me to give him some whisky. When he was told that I had no whisky, but would destroy all there was in the village if he did not behave, he set up a furious yell and flung himself upon the ground, howling and tearing up the grass like a wild animal. We escaped from the crowd and regained our camp without further adventure, but long after darkness had obscured the view in all other directions the glare from a hundred fires lighted up the plain in the vicinity of the village, and the dark forms of the natives could be seen flitting to and fro, and their howls and shouts of bacchanalian laughter came floating down to us on the wind, showing that the orgy was still at its height.

August 24, 1884.—The day began with a moderate breeze from the northwest, and at noon shifted to the northward and commenced blowing hard. We shifted the anchorage of the launch to a more sheltered spot and got out both stone anchors. At sunset the wind had increased to a moderate gale, and the sea had risen so much that I feared the launch would either drag her anchors and go on the beach, or be swamped. We placed the coal on board to-day and that set her so much by the head that she was unmangeable under sail. Wilbur and I stayed by all night, and at 12 o'clock the seas were making clean breaches over her and we were kept busy bailing until morning.

August 25, 1884.—At daylight the gale moderated somewhat, and at 7 a. m. I got ashore from the launch and examined the entrance to a lagoon about one mile to the eastward of us and found a narrow channel leading to a safe harbor for the launch. At 8.30 we put two reefs in the launch's sail, and having shifted all the coal aft, got under way and stood for the entrance to the lagoon. The wind was now blowing a gale from the northward, and a heavy chop-sea was running in the sound. Fortunately for us the launch did not touch bottom in the narrow channel, and at 9 o'clock we came to anchor in a lagoon which extends nearly across to Cape Blossom. During the afternoon we brought the tent and camp outfit to this harbor, and at night I was thankful we had so snug a place to lie, as the wind increased to a gale, and the sea in the sound became so high that the launch would not have lived through it. Natorak brought me a present of tea from the chief of the Selawik Indians, who also desired that I should pay him a visit. Accordingly I went over to the village and called on the old man. He was very glad to see me, and after making me a present of a bear-skin asked me to take supper with him. I accepted, and in a short while we sat down to a repast consisting of seal meat, berries and oil, and flour paste, brought to a close by a cup of tea brewed for my especial benefit in an old tomato can.

August 26, 1884.—The wind shifted to the eastward during the night, and this morning the water had fallen some five feet, leaving the launch aground on the soft muddy bottom. The channel leading from the inlet to the sea is greatly affected by the wind, and a single gale will so alter its position as to make it impossible to place any dependence on previous soundings. During the day I visited the village for the purpose of locating the channel while the water was low. From a high point of land the position of many shoals was located with the aid of the sextant, but as far as I could see there is no regularly defined channel leading to the sea.

August 27, 1884.—The weather continues clear, but is growing cold, and though we sleep in the tent we find it hard to keep warm during the night. I observed signs of frost on the leaves this morning, and the mud around the edges of the lagoons was partially frozen. The chief of the Selawiks took breakfast with me this morning, and after that ceremony was over he had a smoke and then stowed himself away in a corner and slept soundly until dinner was announced at 5 p. m. We gave him some boiled fish and bread, and after dinner I negotiated with him for a bag of flour, as ours is nearly gone. The continued wet weather we had at the beginning of the trip spoiled our baking-powder, and we have bread now in its primitive state. Although nothing is

said by way of complaint, I know every one is looking anxiously seaward a hundred times a day for the sight of smoke which will herald the *Corwin's* approach. The wind was light all day from the westward, and the water did not come in sufficiently to float the launch.

August 28, 1884.—Began with a moderate west breeze and overcast, with light rain. At 5 a. m. observed the *Corwin* at anchor off Cape Krusenstern. At 9 a. m. stood out of the river into Kotzebue Sound. Found a rough chop-sea in the bay. At 11.30 sighted the *Corwin's* surf-boat heading for us and came to anchor. The breeze increased and the sea rose so much that we decided to return to the harbor and wait for better weather. Accordingly, the surf-boat accompanying us, we re-entered the harbor and came to anchor at 1.30 p. m. The latter part of the day a strong breeze and a moderate gale from the west-northwest sprang up, with a heavy sea in the bay. The Indians congregated in great numbers upon the arrival of the surf-boat, and they were in our way continually. In order to distract their attention we visited the village *en masse* and remained there till 10 p. m. Night came on cold, and the men experienced some discomfort in their airy quarters.

August 29, 1884.—Began with a fresh northwest breeze and overcast. At 10.30 the surf-boat got under way and stood out of the harbor. Mr. McLenegan, of my party, left for the *Corwin*. There being no necessity of his remaining longer, at his request I gave him permission to rejoin the ship. At noon, the wind having lulled somewhat, we got steam up and stood out of the harbor and passed into Kotzebue Sound. We stood for the channel, but were obliged to turn back on account of the sea, which made clean breaches over the launch. At 3.30 we re-entered the harbor and came to anchor. Night came on cold and windy. At midnight the wind was still blowing, but unsteadily, so that I hoped to be able to go down the bay in the morning. Average temperature, 50°.

August 30, 1884.—Began with a moderate northwest breeze, clear, with light snow-flurries. At 5.30 ordered steam on launch, broke camp, and cached the skiff near our encampment, as I thought I could not tow both boats over the bar. At 7.30 a. m. got under way and stood out of the harbor. At 9.30 stood westward in Kotzebue Sound, and at 10 a. m. took the skin boat in tow. Sounding along the beach I found from three to four feet of water. At 12.30 crossed the bar and met the surf-boat fifteen miles westward of Cape Blossom, with Lieutenant Cook in charge. Had dinner at 2.30 p. m., and got under way and stood southward. The wind increased and we dropped the skin boat, as she could sail faster than the launch could tow her. At 4.30 took in sail and unstrapped mast. Steamed alongside the *Corwin* and reported our return on board to Capt. M. A. Healy.

Number of days on trip	54
Number of days under way	43
Number of miles made up the river	370
Number of miles made in exploring Selawik Lake and region	204.9
Number of miles from *Corwin* to mouth of river	75
Number of miles from Selawik Lake to *Corwin*	85
Total number of miles made	1,104.9

Respectfully submitted.

JOHN C. CANTWELL,
Third Lieutenant U. S. Revenue Marine, in charge of Expedition.

EXPLORATION OF THE KOWAK RIVER, ALASKA.

ETHNOLOGICAL NOTES.

BY

THIRD LIEUT. J. C. CANTWELL,
U. S. Revenue Marine.

1884.

(ILLUSTRATED WITH NINE PHOTOGRAPHS AND FIVE PLATES.)

INTRODUCTORY.

In taking up the subject of Alaskan ethnology I feel the natural hesitation of an inexperienced observer to advance any new theories, or even discuss old ones, touching such a vast branch of the study as treats of the origin of the Eskimos and their tribal classification. The object of this report will be, then, to describe as simply as possible the characteristic feature of the natives as they appeared to me during the work of exploration of the Kowak River and Selawik Lake region, leaving to more competent ethnological students the important work of sifting and reducing the evidence as here presented into such form as may be of service in the preparation of a more formal and pretentious work.

Range of observation.—For reasons fully explained in the narrative account of the exploration of the Kowak, the expedition was compelled to relinquish the attempt to reach the headwaters of the river and to return to the coast. When this had been accomplished there still remained a sufficient time from the period allotted me to make a short journey by boat through the Selawik Lake region, embracing the circumnavigation of the lake and a partial examination of the river delta. This reconnaissance not only brought me into contact with the native living in this region, but furnished me with information in regard to the topography, which resulted in several important changes being made in the maps of that section of the country. (See description of chart.)

After the completion of this work I moved our camp to a sand-spit projecting into Kotzebue Sound, from the southern side of the entrance to Hotham Inlet, where the coast natives of the several settlements from Bering Strait, northward to Cape Lisburne, had rendezvoused to trade with the natives of the interior living on the Nöitoc, Kowak, and Selawik Rivers. The opportunity thus offered me for observation was not lost, and in company with Mr. McLenegan and our interpreter I visited the rendezvous every day. By persistent questioning and close personal observations the information which is here furnished was verified and corrected, and afterwards reduced to its present state. I have resisted the temptation seemingly inseparable from the first attempts of a writer in an entirely new field to exaggerate the facts falling under my notice, and have rejected all material which did not stand the test of thorough investigation, or about which there existed any material difference of opinion. In this way I believe I have obtained data in regard to these people which, if not all new, is at least reliable, and will furnish available matter for filling in a portion of the blank space on the ethnological chart of Alaska.

ALASKAN ETHNOLOGICAL NOTES.

INLAND NATIVES.

Under this subdivision I include the natives living in the interior of Northwest Alaska, on or near the banks of the three large streams whose waters empty into Kotzebue Sound through Hotham Inlet, namely: the Nöitoc, Kowak, and Selawik rivers. The language of these three tribes differs so little that it may be looked upon as a common tongue, and their general habits and customs are so similar that they may be considered as one race.

Mode of life.—During the first part of the winter, when the sun is in the south and the long Arctic night is on the earth, all these tribes live in small isolated communities, usually consisting of from one to three families, in subterranean houses erected near the banks of the larger streams. With the return of the sun and daylight they desert these houses, and as soon as the ground is in good condition, that is to say, when the snow has fallen in sufficient quantity and the surface is frozen to the requisite degree of hardness to furnish good traveling, they take up their nomadic mode of life and do not settle permanently into villages until the fishing season sets in late in the following spring. In response to repeated inquiries as to whether there were any permanent winter settlements in the interior, I was informed that none existed. The flesh of the reindeer furnishes the natives with their chief means of subsistence during the winter, and in hunting they are compelled to follow them hundreds of miles, from place to place, over the vast tundra plains in their restless search for food. Under such circumstances the establishment of permanent winter settlements is impossible.

During these winter migrations the young men of a family or commune first push forward on snow-shoes to locate a herd of reindeer, and are followed by the old men, women, and children, who bring up the *impedimenta* of domestic economy on sleds drawn by dogs. The work of the women on these occasions is especially arduous; and for all the struggle for existence is prosecuted in the face of difficulties which would seem to our minds absolutely appalling. Arrived at a suitable place for encampment, which must not be too far removed from the feeding reindeer, nor yet so near as to risk stampeding their quarry, all hands set at once to work to build a snow house or *igloo*. This work is soon finished, and the sleds are unloaded and placed on the top of the house out of reach of the famished dogs, who would speedily gnaw the deer-skin lashings on the sleds to pieces if left within their reach. Meanwhile the boys have stored away the contents of the sleds within the house, and a fire being lighted by igniting moss saturated in oil contained in a stone lamp the women proceed to cook what there is to be eaten.

Every morning, when the weather permits, the hunters of the party leave the *igloo* and prosecute the search for game, and at night, when they return, the women divest them of their wet clothing, furnish them with dry garments, and cook whatever has been brought in by the provider. A small portion is usually set aside out of the amount provided for future use, but all these people are strangely and often fatally improvident. It seldom happens that there is more than two or three days' extra supply of provisions on hand, and as it frequently happens that stormy or intensely cold weather keeps the hunters close prisoners within doors for a week at a time, starva-

tion often threatens and sometimes overtakes whole families at once. Except in the case of drying sufficient fish to last them from the time the rivers are frozen over until the winter hunting begins, there does not appear to be the slightest attempt on the part of the natives to lay up any amount of provisions in time of plenty to be used in case of accident or an unusual scarcity of game. The cooking of these natives while living in their snow houses is done by filling a small wooden tub with snow, which melts when brought in the heated air of the *igloo*, and is brought to the boiling point by plunging into it stones heated to redness in the flame of the stone lamp. The meat is partially boiled by this means.

When two or more parties happen to meet on one of these hunting expeditions they endeavor to combine the herds they are respectively following, and if successful they will thenceforth hunt in company, looking upon the products of the chase as common property. Although most of these natives are provided with fire-arms, the native spear and arrow, both fired from a bow, are used in hunting the reindeer. Fire-arms are objectionable both on account of the scarcity of ammunition and the noise of discharge.

Toward the last of the season, when the snow begins to leave the ground and the ice is melted in the rivers and lakes, the reindeer begin to grow more restless and harder to herd, a grand hunt is inaugurated. By a preconcerted arrangement the natives drive their several herds toward a point, contriving to get them all there about the same time. In the region near the headwaters of the Kowak, Nöitoc, and another river which native reports impress us with the belief is the Colville, is a lake forming the headwaters of the latter stream. It is on the shores of this lake that the grand annual hunt takes place. The reindeer are gradually herded together and partly surrounded by the hunters, who then slowly contract their lines until the deer find themselves inclosed on all sides except one, and that has been purposely left unguarded by the hunters. When the movement has reached this stage the hunters rush forward, shouting and making all the noise possible, for the purpose of stampeding the deer. This is generally successful, and hundreds of the poor creatures plunge into the lake, for this is the only point by which escape seems possible, and are followed by the hunters in boats provided for the purpose and a carnival of slaughter follows.

With the opening of spring, when the ice in the rivers begins to break up and the snow has melted to such an extent as to render traveling by sled any longer possible, the natives gather in small settlements along the banks of the larger rivers, erect summer houses or tupecs, the men to hunt and trap, and the women to get ready their nets for the summer fishing. When the ice finally leaves the rivers the hunters get ready their furs which have been collected during the winter, and descend in open boats to the coast, where they meet white traders who come into the Arctic during the summer season for the purpose of barter. Usually these natives remain on the coast either for the purpose of trading or for pleasure, in taking part in the games and festivities, attending the summer rendezvous until winter again comes on and the cold weather reminds them that they must return to their inland homes.

Meanwhile the women, who appear to be the only creatures of the body politic (not even excepting the dogs) who have no season of rest, are busy with the fishing. During exceptionally open winters, when the ice in Kotzebue Sound moves off shore early in the spring, and thus allows the ice-gorged rivers to free themselves, there are two runs of salmon, but when the ice remains packed in close to the shore, as it usually does in Kotzebue Sound, until late in the season, only one run takes place. This was the case during the season of 1884. We entered the river on the 8th day of July, and at each of the fishing villages passed on our way up the lower river we found the people suffering for food on account of the late run of fish. Before we turned to descend, however, the salmon had arrived, and we had ample opportunity for observing the methods in use with the natives for capturing and curing the fish. The site of a fishing village is usually on a sand and gravel beach near the water's edge and at a part of the river where the channel is contracted by shoals. The houses at these villages are very simple affairs, made by planting a half dozen supple willow wands into the ground in the form of a circle and then bending their upper ends toward the center and twisting them together basket-fashion to form the frame. Over this frame a covering made of drilling or deer-skins is thrown and the house is complete. A primitive but serviceable shelter from the hot sun and almost continuous rains of the summer season was observed at

LITTLE GIRL, SHOWING IVORY CHARM WORN AROUND THE NECK.

several villages made with a covering of large pieces of birch bark sown together. In each village there is a store-house made of heavy pieces of timber stood on end and a flat roof made of small poles, where fish are stored after having been dried in the sun. This house has a rude door which can be closed and thus effectually prevent the depredations of dogs.

As no cooking is done within the house during the summer there is no necessity for an opening in the roof for the escape of smoke, and in order to be protected as much as possible from the tormenting mosquito exit and entry are made by lifting a corner of the covering and crawling under as quickly as possible. Additional protection is had by building fires made of green boughs, which produce a stifling smoke.

The nets used in taking the fish are made of thread manufactured by twisting together the tough fibrous root of a species of plant found in abundance along the banks of the river. They are from thirty to sixty feet long and from four to five and one-half feet wide and are made with a two to three inch mesh. The knot used in forming the mesh is the ordinary "fisherman's bend." Sinkers are made from short pieces of reindeer antlers or bits of stone. The boats used by the women in laying out the nets are made of spruce bark ingeniously fastened to a wooden frame by thread made from the inner bark of the willow. The seams are made perfectly water-tight by cementing them with melted spruce-gum.

At the height of the fishing season some one is always on the lookout for a school of fish, and when one is seen approaching the village—and the commotion in the water leaves no room for doubt—two or three women leap into a boat, in which is a net all ready for laying out, and paddle vigorously up stream until they reach a point about one hundred yards above the village. One end of the net is now landed and held by some of the women on shore while the boat's head is turned across stream. When all of the net has been laid out the boat is allowed to drift with the current, and the shore end of the net being held stationary, the boat gradually approaches the beach. When she grounds the women leap out and begin hauling in the net with its plunging, flashing catch of salmon. Many escape by leaping over the top of the net, and to prevent this the little boys rush into the water and, seizing the fish by their tails, throw them far out on the beach. One of the amusing sights witnessed by our party while looking on at the hauling in of a seine was the spectacle of a very small boy who had seized a very large salmon, whose vigorous efforts to escape had reduced the plucky youngster to the necessity of piteously calling for help.

The fishing season is a period filled with rare enjoyment to at least one class of the native population. The old men who are too feeble to make the long journey to the coast and return are left at home with the women, and do nothing but eat fish and sleep all the time. A fire is kept going night and day, in which large round stones are heated and then thrown into a tub of water. By this means the water is brought to the boiling point, when the stones are removed and replaced by fish. An old woman superintends the cooking, armed with a huge spoon from the skull of the mountain sheep. When she declares the feast ready everybody gathers around the fire, and after the old men have been served the rest help themselves. The fish are eaten from small wooden platters or shallow bowls.

In addition to the method of catching fish with seines, as described above, the use of conical-shaped willow traps is common. They are made to sink beneath the surface of the water and with the entrance so constructed that the fish can easily get into the trap, but find it impossible to get out. For some species of small fish, such as the grayling, trout, etc., a native fish-hook of ingenious manufacture is used with great success. (See sketch, Figures 2 and 4, Plate II.)

The salmon are cured and prepared for winter use by splitting them open and removing all the offal, the head, and backbone. Transverse cuts are then made in the flesh and the body is hung up to dry on racks placed along the beach. The roe is dried separately. I saw only one instance of fish being buried to be subsequently exhumed and eaten when putrid. I do not believe the custom is as common here as it is with the Yukon River natives.

Physical appearance.—The natives of the interior have, as a rule, rather dark complexions, prominent cheek bones, large mouths, and a sharp chin, giving to the face a triangular appearance very different from the round face of the coast Eskimo. Their hair is black and straight. It is worn long except in front, where it is trimmed across the forehead on a line with the eyebrows. They are quick in their movements, active and strong in youth, but grow aged-looking rapidly.

What impressed me was the fact that I saw very few men of *apparent* middle age. The women are somewhat lighter complexioned than the men. Their faces are more oval-shaped, and their eyes have a much softer expression. They wear the hair parted neatly in the middle and arranged in two braids, which are worn in front of the ears. In common with all these northern tribes, the extremities of both sexes are very small, and, in the case of the women, remarkably well shaped.

Moral character.—The fact that these interior tribes are better morally than their brethern of the coast is so apparent that even the dullest observer must see the difference between the two, and wonder how it happens that these natives who have been brought into contact with our boasted civilization are more objectionable in their manners and less trustworthy than those who have not enjoyed these advantages. A few words will suffice to show the moral character of these gentle hyperboreans. They are honest in their dealings with strangers and amongst themselves, as we had ample means of finding out. They are simple and credulous, and easily deceived, showing that they are not liable to deceive others. They are hospitable, and although intensely curious, are not prying or intrusive. In their domestic relations they are kind and devoted to each other, and the universal consideration paid by all to the very old and feeble is one of the touching and admirable traits of their character. The extraordinarily kind and indulgent treatment of their children is a trait which is common to all these northern tribes.

They have no laws except that one which seems to be inherent in the hearts of all rational beings, to "do unto others as ye would others should do unto you," and I believe that these people live up to that law as perfectly as their sense of what is right and wrong will allow them. There are certain contradictory phases of character in all of these tribes which seem at first glance to be irreconcilable with their generally kind and loving disposition. I allude to the harsh treatment of their women, especially at the time of child-birth, and at other periods when nature would seem to claim for them the utmost care and protection. Following the customs of all of the Alaskan coast tribes in this region, the women are isolated at the time of confinement, and for a period of a week or ten days after child-birth no fresh food is allowed to pass their lips. At the time of her monthly periods of menstruation a woman is not allowed to enter a boat or ride upon the sled of her husband. This often entails on her additional hardship in a life which at best is but one long act of drudgery.

Another bad trait of these natives is their apparent inability to tell the truth under certain circumstances. The traveler must accept with care the tales some of these Munchausens tell of the size of fish, length of rivers, width of lakes, etc. Upon cross-examination when a statement is proven to be false or erroneous they do not evince any shame whatever.

Government.—Where there are no laws it follows that there is no necessity for rulers, and so it is with all these tribes. There are no recognized chiefs, nor does there seem to be any tribal union among them. With the interior tribes the exercise of "Shamanism," so-called, is prevalent, and the "shaman," in some instances which came under my notice, seemed to have a preponderating influence in the councils of the settlement or commune. Exactly how the "shaman" receives his supposed power which he claims enables him to converse with spirits was not clearly explained. Some peculiar circumstance attending his birth, or the fact that he has passed through some ordeal which few could undergo, probably has much to do with the case. Again, in all communities of human beings there seem to exist individuals who are gifted by nature with a higher order of intelligence than their fellows, and for that reason are naturally looked up to and their advice sought on all important occasions. The "shamans" whom we had occasion to deal with were observed to be more retiring and dignified in their bearing than what I was led to expect from reading reports on the subject by other writers. They were generally the last to make our acquaintance at a settlement and seldom remained long near our camp, which was a trait so unusual with the natives as to attract our attention at once. An instance of the display of the "shaman's" powers is mentioned in the narrative portion of this report.

The omailik or chief trader and general business agent of the Eskimo coast tribes is not so common among these nomadic people. They have so little to barter that it does not give any one man the chance to accumulate wealth by the exercise of a superior talent for business.

In all discussions touching the welfare of the community or any important project, the women, especially the old ones, join, and their opinions are received with evident respect by the men.

While there are no laws among them and consequently no recognized punishment for the com-

GROUP OF NORTON SOUND NATIVES, FORT ST. MICHAELS.

NATIVE VILLAGE, KING'S ISLAND.

mission of crime, there exists a kind of moral code which governs them in all their relations one with another. To disturb a cache of clothing or provisions which does not belong to one, for instance, is considered a very great sin; but should intense suffering or imminent danger from starvation make it necessary to open anothers cache there is no redress for the owner and none is sought.

Diseases.—Pulmonary complaints and rheumatism are the principal causes of sickness among these natives. Weak or inflamed eyes are frequently seen, but it is probable that the cause is attributable more to neglect of sanitary precautions in regard to ventilation of their winter houses than to any organic disorder. Epidemic diseases are of rare occurrence. Small-pox sometimes reaches this region through communication with the natives living on the Koyukuk River, a confluent of the Yukon; but as I observed only one native marked with this dread disease it probably never reaches the epidemic stage. Syphilis has not as yet reached the interior settlements to any great extent, but as it is common among the coast tribes, it is only a question of time when its ravages will extend to these people. But little is known in regard to the treatment of the sick, and it is believed that beyond a very few herbs used by the "shaman" to assist him in his incantations of evil spirits while attending the sick, nothing is given in the way of medicine to cure the disorder.

Funeral ceremonies.—The dead are not interred nor does there appear to be any formal funeral ceremonies. The body is removed to some secluded spot, usually on a bluff overlooking the river, and laid upon the ground. A shelter is made by erecting a small conical-shaped structure of spruce logs over the body and a tree near by is stripped of its branches and small pieces of cloth are tied to it to mark the spot. The household utensils, sled, and some of the weapons of the deceased are left with him, and the spot is tabooed henceforth.

Food.—As has already been intimated, the principal food of the natives during the winter months is reindeer meat. Fish are also caught through holes made in the ice on the rivers and lakes which dot the country. The flesh of the bear, fox, wolf, muskrat, beaver, and mountain sheep also is eaten, and forms a welcome addition to their ration. During the brief summer season salmon is the principal article of subsistence with those who live far inland on the rivers, while those who make the journey to the coast or who live in the settlements near the mouths of the rivers have a much greater variety of articles to eat. The flesh of the seal and white whale is eagerly devoured and the greatest abundance of many varieties of edible berries are found on the tundra plains. Among these the salmon and blue berry are favorites and are eaten by the natives soaked in seal oil. Wild currants grow abundantly in the higher land of the upper-river region, and among the wild edible roots indigenous to the region, observed by our party, were the onion, celery, parsnip, and a plant resembling rhubarb. The parsnip is considered poisonous on the Yukon River, but our party frequently ate the species found here without any perceptible evil effect. The tender shoots of the willow are cooked in oil and eaten by the natives when hard pushed for food.

I was curious to observe how our food would be accepted by the natives, and found that for such articles as flour, pemmican, tea, and rice they showed a decided fondness. Sweets, such as sugar, canned fruit, and condensed milk, were also greedily eaten; but for salt pork they evinced such aversion that there could be no mistaking their repugnance for it. During the time some of the natives were with our party and living on our ration, whenever pork or bacon formed the meat portion of our meals they would not touch it, and I was compelled to purchase some dried fish for their especial benefit. The upper waters of the Kowak and the many lakes and lagoons near the rivers teem with myriads of geese and duck during the breeding season, which lasts from July until the latter part of August. Swans and cranes are also found in limited numbers in the more secluded parts of the river and interior lakes. All these birds are boiled after being skinned. The head, feet, and intestines are considered the choice morsels. This fact first came to my notice while camping in company with some river Indians who had shot a goose. With the intention of paying me particular attention, these tidbits were set before me by one of their number.

Clothing.—The clothing of all these tribes is essentially the same, consisting of an outer and inner coat or "parka" of deer-skin, tight-fitting trousers of hair-seal skin, and boots with deer-skin leggins and soles made of walrus or white-whale skin. In winter the inner garments are worn with the fur next to the body and the outer ones reversed. No hats or caps are worn by either

sex, but the outer "parka" is made with a hood, which is drawn over the head, leaving only the face exposed during cold weather. Around the edge of the hood a piece of some long-haired fur is sewed to protect the eyes from flying particles of snow. Wolf-skin is usually preferred for this purpose. The women's "parkas" are much longer than the men's, reaching below the knee in front and behind, but cut up on the sides almost to the waist to allow of a free use of the legs in walking.

The women wear a belt to confine their "parkas" around the waist, and to it are fastened by short deer-skin thongs bits of ivory, metal buttons, leather bags in which are kept tobacco, matches, needles, etc., and any other small article of value to them. This belt also enables a mother to carry her baby underneath the folds of her "parka," which is the usual resting place of the young Eskimo. In addition to the boots, inner shoes or socks made of soft, tanned buck or hair-seal skin are worn. Mittens made of reindeer-skin, with the hair turned in, are worn winter and summer. During the summer season much lighter and generally more worn clothing is used, the inner garments are discarded, and where cloth can be obtained it is substituted for fur. The skins of the muskrat and squirrel are extensively used for summer parkas. At several places on the Kowak I observed children with only one garment on—a parka—which left their legs bare to the attacks of the blood-thirsty mosquito, and compelled them to crouch down near the ground and withdraw their arms from the sleeves of the parka to avoid these pests. Some of the children's parkas are made of bird-skins sewed together, and the sight of half a dozen of these little savages sitting crouched along the banks of the river reminded us of a flock of storks fishing. All the clothing of these tribes, and, in fact, everything they wear or use capable of harboring life, abounds in vermin. Their houses are so filled with these disgusting creatures that after one sad experience I never entered a winter habitation. The women make all of the clothing and keep it in order. They are expert in the use of the needle, but their work in this respect does not compare with that of the coast natives. Thread is made of deer sinew, and I saw a few specimens of needles made of bone, but they are now almost obsolete, being replaced by steel needles obtained in barter on the coast.

Transportation and locomotion.—The interior of northwest Alaska is composed of detached, broken, and irregular mountain ranges and vast stretches of sponged sphagnum or tundra plains. These plains are crossed in every direction by small streams, which take their rise in innumerable lakes. If the inexperienced traveler, tired of the confinement of his boat, leaves her and attempts to walk, he will not get very far before he finds himself plunging and floundering in an impassable morass. Underneath the moss-covered surface the earth has been reduced to a mud-like consistency by the constant rain from overhead and the melting ice which forms the base of the thin layer of soil. There are no continuous mountain chains where by seeking the high ridges one may avoid the tundra, and even on the mountains the dense growth of moisture-holding moss is found at an elevation of 2,000 feet. In such a country the use of a boat for summer traveling is imperative. The native never thinks of making a journey of any consequence at this season by any other way than by water.

At the settlements near the coast the ordinary skin boats and kaiaks of the Eskimo are used, but when we reached the region of the Upper Kowak, where timber was abundant, we found the skin boat had been replaced by boats made of spruce and birch bark. The former material is used extensively in the construction of the large boats used by the women while fishing and for the purpose of general transportation. Lighter canoes of most exquisite design are made of birch bark stretched over frames made of well-seasoned wood. These little boats are from eight to ten feet long by two feet wide at the point of greatest breadth of beam, a little forward of the center of the boat. From here the sides curve to a point at each end. They are undecked except for a short distance forward, where a piece of bark is laid across the bow and secured to the rail on either side. The bark is put on the frame in transverse sections for greater strength and is secured in place by lashings made of willow bark. The seams of all the bark canoes and boats are made water-tight by cementing them with melted spruce gum. The single-bladed paddle is used exclusively in the large boats, but in the small canoes both single and double bladed paddles are used. In shoal water, or when keeping close to shore to avoid the current, paddles are discarded and the boats are forced ahead by "poling"; short sticks or the shafts of spears are used for this purpose. The canoes are used exclusively by the hunters, and, although they are very frail and do not weigh

NATIVES AT RENDEZVOUS NEAR ICY CAPE, ALASKA.

NATIVE KYAK.

over twenty-five pounds, the natives handle them with such skill that they are seldom injured, and they will fearlessly venture into rapids filled with rocks where the slightest error of judgment would result in destruction to their boats.

To keep these boats in good order it is necessary to have them perfectly water-tight. The seams need constant attention, and this work falls upon the women. We had two canoes with us on our expedition, and whenever we stopped at a fishing village some of the women would haul the boats up on the beach and repair any breaks or stop any leaks which showed themselves by holding a lighted firebrand and a piece of spruce gum together and by blowing vigorously melt the gum sufficiently to apply it to the weak or damaged spot.

During the winter season transportation of heavy articles and the movement of families is effected by means of dog-sleds. The sleds are from six to eight feet long by two to three feet wide. They are made of wood securely lashed together with thongs made of deer or seal skin. Some of the sleds are furnished with handles behind to steer by and rails along the sides, to which is secured the load. The runners are sometimes shod with ivory or bone, but more frequently are left bare and protected with a shoe of ice when in use. The ability to make an ice-shoe which will be serviceable is one of the tests of a good Eskimo hunter. A team of dogs is usually composed of five dogs, but three strong, well-broken animals will drag a heavy load at a very fair speed. The proper management of a dog team is something which seems to be almost impossible for white men to learn, and a native driver is as essential as the team itself if a journey is to be made by dog-sled. The dogs are trained to travel long distances without food and are never fed, except at rare intervals, until the day's journey has been accomplished. The driver runs ahead of the dogs and by cries of encouragement induces them to follow him. If the journey to be taken has been performed before and the road is familiar to the dogs, they require no coaxing, but dash away at full speed, anxious to have the work done and receive their reward in the shape of a meal of dried fish. The harness used on the dogs is very simple. It consists of a few straps so arranged as to bring the strain and weight of the load on the shoulders. The dogs are driven tandem. Much depends on the condition of the road, the state of the weather, etc., in forming an estimate of the length of a day's journey, but under ordinary circumstances sixty miles a day is reckoned as the average amount of work which a dog team can accomplish. But even this can not be kept up for any great length of time. Their feet get tender and sore and they become peevish and quarrelsome. At such times they are unreliable and almost unmanagable. The smooth surface of the rivers after a light fall of snow has covered the ice is much used by sled parties, but where the meandering course of the stream would lengthen their journey considerably the natives leave the river and take to the rolling land above the timber line. In traveling to and from their winter hunting and trapping grounds the natives make use of well-known routes, and at several points along the banks of the stream A-ta-ta-rok, our guide, pointed out to me a tall pole to which was fastened the form of a bear or fish rudely carved, and informed me that those were guide-posts set up by the natives to indicate the points where they must leave the river. Monuments composed of stones were also observed on the tops of several low mountains near the river, having been built by the natives for beacons during the time when the snow covers the ground and hides all familiar features of the landscape from sight.

The snow-shoes of the natives of this region are much longer and of finer workmanship than any I have ever observed at other places in Alaska. They range from three to five and a half feet in length by five to ten inches in width. The frame is made of one piece of spruce or larch bent into shape when green. The forward end is rounded and the two ends of the piece of wood forming the frame are brought together and lashed with a stout thong of deer-sinew. The front is now turned up a distance equal to about half the width of the shoe. Two pieces of wood are inserted transversely between the sides of the frame about three-quarters of the distance from the rear to the forward end and securely lashed. Stout thongs of bear-skin or other strong material are passed around these cross-pieces to make a foot-rest, and the spaces to the rear and in front of the foot-rest are filled up with a very fine but strong netting made of twisted deer-sinew. The method of securing this thread to the frame so as to prevent its being chafed through by contact with the snow is very ingenious. The shoe is attached to the foot by broad toe-straps fastened to the front cross-piece.

WEAPONS AND IMPLEMENTS OF THE CHASE.

In the course of my investigations I observed five forms of spears and three of arrows; the description and uses of which are as follows:

SPEARS:

(1) *Reindeer; Thrusting.*—Shaft of spruce or larch about five feet long, slightly tapering, with head of chipped flint, ivory, or, rarely, jade.

(2) *Projectile.*—Light wooden shaft three and one-half to four feet in length, with short chipped flint or iron head, shot from a bow.

(3) *Throwing.*—Shaft four and one-half to five feet long, smaller than (1), with barbed ivory or bone head two and one-half inches long, darted at fish or small game.

(4) *Bird spear.*—Light wooden shaft like (3), with barbed ivory or bone head, rarely curved, and with three ivory or bone prongs fastened in the middle.

(5) *Bear spear.*—Shaft larger than deer spear, with iron or chipped flint head, rarely obsidian or jade.

ARROWS:

(1) *Reindeer.*—Shaft two and one-half feet long, with long ivory, bone, or chipped flint and, rarely, obsidian head.

(2) *Bear or other dangerous game.*—Shaft larger than (1), with short, sharp-pointed iron or chipped flint head.

(3) *Bird.*—Light shaft feathered at small end, with blunt bone or, rarely, stone head.

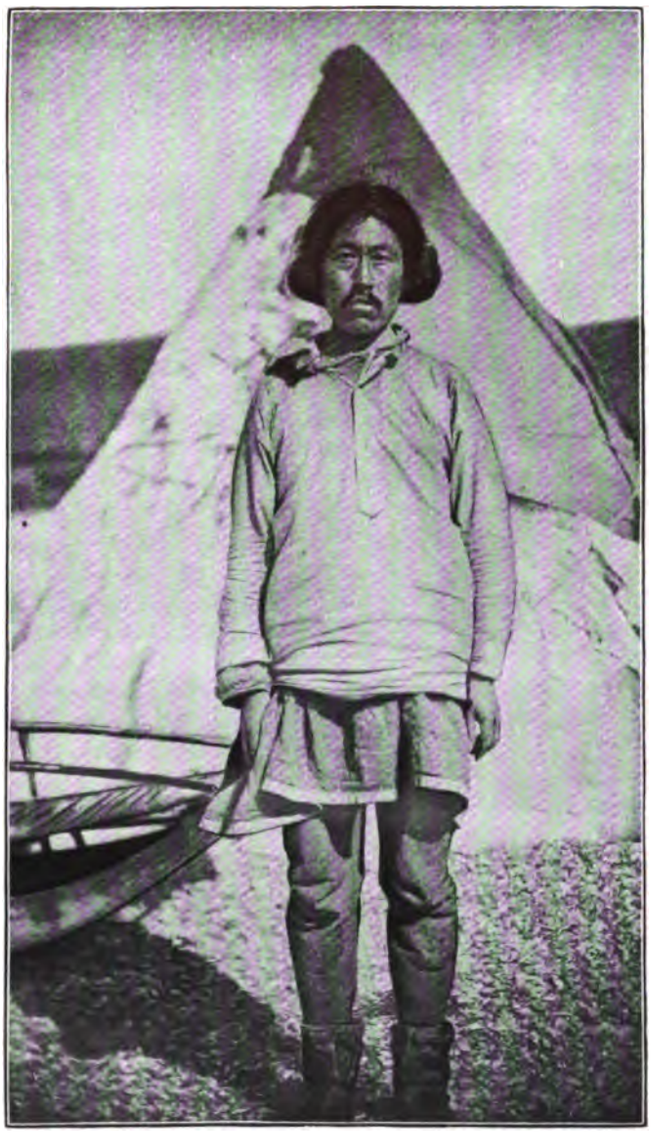
The bow used by the natives is about five feet long, made of larch and re-enforced with rawhide or sinew. In order to increase the propulsive power of the arm in throwing spears a flat board is used eighteen inches long and two and one-half inches wide, having a hole through one end for the finger and its upper surface grooved to steady the weapon.

Bird slings.—Made of several oblong pieces of ivory one and one-half inches long by one inch thick, having holes in the ends, to which are attached thongs of rawhide or deer-sinew. In practice, the thongs being knotted together so as to leave the pieces of ivory suspended freely at a distance of about two feet from the knot, a kind of "bulas" is formed, which is thrown into a flock of birds with the intention of entangling their wings and rendering their capture easy.

Snow spectacles.—In order to protect the eyes from the glare of the snow, wooden blinders or spectacles are worn. They are made of soft wood hollowed out to fit over the eyes, and a narrow slit is made in each pair large enough to look through.

Traps.—The ordinary steel spring trap of commerce is used by all of these tribes, and forms one of the staple articles of trade between them and the traders on the coast. Besides these the natives employ a number of means of capturing animals and birds, some of which are common to all hunters and others which are peculiar to this region. Bear traps are made of very heavy logs, which are so arranged as to fall on the animal when an attempt is made to take the bait. They are clumsy affairs, and the natives confess that they are not very successful in capturing this animal by means of these traps. For smaller game, such as foxes, lynx, beaver, etc., steel traps or figure of-four traps of native make are used. Deer are sometimes driven into the snow-choked gorges of dry river-beds and into pits over which a light covering of brush and snow has been laid. Along the sandy beaches of the river I frequently saw a row of small stakes or bushes set up, and on inquiring their use was informed that the geese which breed here would not attempt to force their way through this line of stakes, but would follow it up until an opening was found, and here a trap would be set. The boys use loops and snares made of deer-sinew fastened to small trees bent down and so arranged that any disturbance of the bait will cause the tree to be released and fly violently upward. By this means hares, ermine, muskrat, grouse, etc., are taken.

Snow traps are made of square pieces of snow arranged like a dead-fall. In nearly all these cases the bait is not put into the trap, as the animals soon learn to shun them, but into little snow houses, and the trap is set and concealed in or near the door. Among the articles which come under this head are loops of sinew used for catching fish instead of using a hook. In the clear



TARTAROK.

water of the upper rivers, where the fish can be seen lying almost motionless in the quiet pools with their heads turned up-stream, this method of taking fish is employed with varying skill and success by the natives.

Implements of special crafts.—The most important article of native domestic economy is the knife. In the past a rude implement was made of stone, bone, or ivory, but now iron has replaced the use of the primitive implements to such an extent that only in rare instances could the latter be found. Iron and steel knives are imported into the country from the United States, and he is a very poor hunter who has not purchased one at least of these necessary articles. As a usual thing the larger they are the better. They are worn strapped to the thigh, and are carefully protected from injury from dampness by a sheath made of hair-seal or deer-skin. In their hands the knife is used either as a weapon or a tool; as a tool it is remarkable what a degree of perfection the natives have reached in its use. Spears, bows, arrows, etc., which require great nicety of finish, are made with the knife alone. The shafts of arrows specially attracted my notice on account of their symmetrical appearance, being as round and smooth as if lathe-turned.

Woman's knife, made of chipped flint, jade, or sharpened slate, with a wooden or bone handle, is still common among the interior tribes. It is used principally in the work of splitting fish during the fishing season.

Drills made of iron or rarely of stone were seen. The point of the drill is inserted in the end of a handle made of soft wood. Drill-bows are made of ivory, bone, or wood, with holes in the ends to which are attached a thong of rawhide or sinew. The upper end of the handle is rounded, and in use is rested against a small stone socket held between the teeth.

Ice-drill.—A short piece of pointed antler made to be lashed to the end of a shaft.

Fire-drills.—A piece of hard wood in shape like an ordinary drill shaft. This method of obtaining fire is now obsolete, but the operation was performed for me by a very old woman after much labor.

Flint-flaker.—A short piece of iron, evidently the remains of a knife with a bone handle. The use of iron and the introduction of fire-arms is doing much to render the use of stone obsolete, and the occupation of chipping flints, which was once pursued with profit by these inland river people and especially by the natives of the Kowak, will soon be entirely gone.

Feathering tool.—Made of a small wedge-shaped piece of bone, used for fixing feathers on arrows.

Needles.—Steel needles from the United States are used almost entirely. I saw only two specimens of bone needles of native manufacture, one of which was made for me by our guide A-ta-ta-rok.

HOUSEHOLD UTENSILS.

Under this subdivision I include, for the sake of brevity, several articles which can not properly be classed separately, but which are not, strictly speaking, used exclusively in the work of the household.

Vessels for holding water, cooking, etc.—Wooden tubs for boiling fish, meat, etc., in are made of a thin, pliable piece of spruce bent into the shape of a circle and having a bottom fitted of somewhat heavier material. No better idea of the appearance of one of these tubs can be had than is furnished by an ordinary cheese-box without the cover. The vessel is made water-tight by pitching the seams with melted spruce gum. The manner of cooking food in one of these tubs has already been described. (See Food.)

Small bowls for serving food are made by carving them out of some soft wood. During the summer season very neat and serviceable platters are made by bending a piece of birch bark into the required shape and securing it by a few stitches of willow-bark thread.

Baskets for carrying fish from the beach to the racks are made by weaving thin splints of willow together. They are very shallow, the native basket-maker apparently not having yet learned to make deep ones.

Horn dippers made in one piece of the skull of the mountain sheep. Used in skimming grease from the surface of water in which food is being cooked and for dishing out the food.

Ivory dipper.—Carved from fossil ivory, which is common on the Kowak and Selawik Rivers. Used in dipping up water, bailing out boats, etc.

Wooden spoons.—I saw one specimen of a wooden spoon evidently made in imitation of a metal table-spoon which had been seen by the maker on the coast.

Forks.—I saw no forks, but shortly after our advent into the river country one of the natives accompanying our party made a very good imitation of our metal ones, of bone with a wooden handle. This he used, much to the amusement of himself and the other natives of the party.

Fire.—Among these natives the flint and steel will probably never be supplanted by the more modern invention of matches, although the latter are used to some extent during the summer season by the coast natives and others who visit the whale-ships. They are not considered as desirable for their uses as the more compact flint and steel. Several plants indigenous to the region furnish an abundant and easily obtained supply of material to make tinder. Among the natives of the interior there are a few old people who have retained the art of making fire by the use of the fire-drill, but the younger generation apparently do not practice it.

Lamp.—Shallow bowl carved from soap-stone. Used for heating and lighting the winter houses and for cooking. There are several sizes, but the ones most commonly seen are about seven inches long and four and one-half inches wide, outside measurement. The space carved out is oblong in shape, and there is a margin of about an inch between this space and the edge of the lamp. In use, the hollow space is filled with oil, and moss is placed around the margin to serve as a wick. The lamp produces a dense smoke, but throws out considerable heat.

Oil bags.—For holding oil used in lamp and in food. They are made of the entire skin of the hair-seal. A small aperture is left, through which the oil is poured when wanted. This is closed by a cord of deer skin or sinew.

Stone axes.—Two specimens of stone axes were seen, one of which was *jade*, and the other a dark brown stone of slaty nature. Neither was hafted. They were exhibited as curiosities with a view to sale to our party. On the lower river I saw one stone adz hafted and in use. The blade was four inches long by two wide, wedge-shaped, and had been chipped to its present shape. The handle was a short piece of wood, to the end of which the adz was lashed with a rawhide thong.

PERSONAL ADORNMENT.

The hideous custom so prevalent among the males of the coast Eskimo of wearing "labrets," disks or knobs of stone or glass, in incisions made in the lower lip is rare among the natives of the interior. A few of the old men had incisions in their lips; but either they were too poor to have them or the custom is dying out, for I saw very few labrets on the Kowak River. Small pieces of beautifully polished jade, of a light green color, were seen on several occasions and are greatly prized by the owners. They are worn as pendants on strings around the neck. As a mark of special favor one of our native guides, who was the fortunate owner of one of these charms, allowed me to wear it on my watch guard for a while, but I could not induce him to sell it.

The women tattoo the chin with three vertical lines on arriving at the age of puberty and increase the number of lines after marriage. I observed on several occasions women whose skins were marked with a broad mark of soot under each eye, but I could not ascertain whether this was for ornament or the observance of some custom in regard to their superstitious belief. All I could learn from André on this subject was that they marked themselves in this manner at certain times because "they liked to." Ear-rings made of bright-colored beads strung on sinew are common with the women, and most of the younger girls have their hair neatly braided and the ends wrapped with strings of small beads. I observed many of the women with finger-rings made of brass or iron, and a few with bracelets made of a piece of rawhide on which was strung a large bead, a brass button, or a round piece of ivory. The ornamentation of the clothing is not so elaborate as that of some of the coast tribes, and rarely shows anything more than a narrow fringe of fur around the edge of the "parka."

All these tribes are universally addicted to the use of tobacco, and the pipe is always an article upon which considerable work in the way of ornament is spent. There were seen so many

GROUP OF TCHUKCHI NATIVES, INDIAN POINT, SIBERIA.

YARANGA AND PLOVER BAY TCHUKCHIS, SIBERIA.

shapes and styles of this one article that it would be impossible to give a description of all. I will, then, take the ones most commonly seen as examples:

The bowl is made of iron, brass, ivory, or stone, cylindrical, with its top flanged and two lugs on the lower end, over which the lashing passes which secures it to the stem. The bore of the bowl is from one-fourth to one-half inch in diameter and holds, when full, about a thimblefull of very finely pulverized tobacco. The stem is from twelve to eighteen inches in length, and is made by splitting a branch of alder or soft piece of wood in two and making a groove in each part. The two parts are then put together so that the grooves lie opposite each other and are securely lashed in this position with sinew.

The women's pipe is longer than that of the men. Each is furnished with a short steel or ivory pricker for clearing the bowl when it gets foul.

FESTIVALS, GAMES, AND AMUSEMENTS.

Living as they do in isolated settlements during the time that they are forced to lead a life of inactivity, these nomadic races have few opportunities for the observance of any very elaborate festal or ceremonial rites. The absence of any large council-houses or *kashimas* of the Russians, at any of the sites of winter habitations which we visited, naturally leads to the supposition that among these tribes the custom of inaugurating extensive feasts, in which native theatricals, story-telling, and exchange of presents form a part so common among the natives elsewhere in Alaska, is not followed.

During the short summer months those of the interior natives who have furs to barter, or who care to make the journey to the coast for pleasure only, descend the rivers and join in the festivities which annually take place at a rendezvous of all the natives of the coast and interior in this region. At such times wrestling, foot-races, and feats of strength and agility occupy the attention of the young men and boys most of the time; and frequently a kayak race and contests between the hunters in throwing the spear from a boat interest the older ones. Dancing, singing, and story-telling also are indulged in on special occasions. (See description of dance in narrative.)

I observed several groups of natives, mostly belonging on the coast, gambling in the camp at Hotham Inlet, and they were playing with ordinary cards.

The children of all these tribes have playthings given them by their indulgent parents, and the sight of a little girl fondling a doll made of wood and clothed with miniature Eskimo clothing was frequent. The boys play with small spears and bows and arrows. When they have arrived at the age of eight or ten they are given a canoe or kayak just large enough for them to paddle about in near the shore.

Notation and method of reckoning time, etc.—Time in days is reckoned by "sleeps," and this system of notation extends to estimates of distances. It thus happens that a certain number of "sleeps" may mean so many days of time or the distance usually traveled in so many days' journey. As a day's journey during the winter is equal to about three in summer, errors in estimating distances are of frequent occurrence, unless the traveler has it fully understood which "sleep" is meant.

There seems to be no extensive system of numeration. The native vocabulary contains, as far as I could learn, only the first ten cardinal numbers. For the expression of numbers greater than ten recourse is had to the fingers and toes, bits of wood or stone, and when this method fails, "a great many," "too many to count," is shown by a handful of sand.

Population.—In consequence of their nomadic life it is impossible to obtain a census of these tribes by actual count. The following estimates, based upon carefully prepared data, represent as nearly as it is possible to obtain the actual numbers of the natives of this region. This estimate includes all the inhabitants of the Nöitoc region in the north, the Kowak in the center, and the Selawik in the southern portion of the section of country described in this report: Nöitoc River, 350; Kowak River, 275; Selawik, 300—total, 925.

PLATE I.—IMLPEMENTS OF THE CHASE, NATIVES OF NORTHWESTERN ALASKA.

1. Holder for throwing spears, one-third size.
2. Snow spectacles, natural size.
3. Section of 2 through A B.
4. Spear-head of ivory for deer, natural size.
5. Arrow-head of ivory pronged for birds, natural size.
6. Spear-head of chipped flint, natural size.
7. Arrow-head of chipped flint.
8. Blunt arrow-head of ivory or bone for birds, natural size.
9. Spear-head of polished jade; very rare.
10. Seal spear with detachable ivory head, one-sixth size.
11. Bird spear with prongs of ivory, one-sixth size.

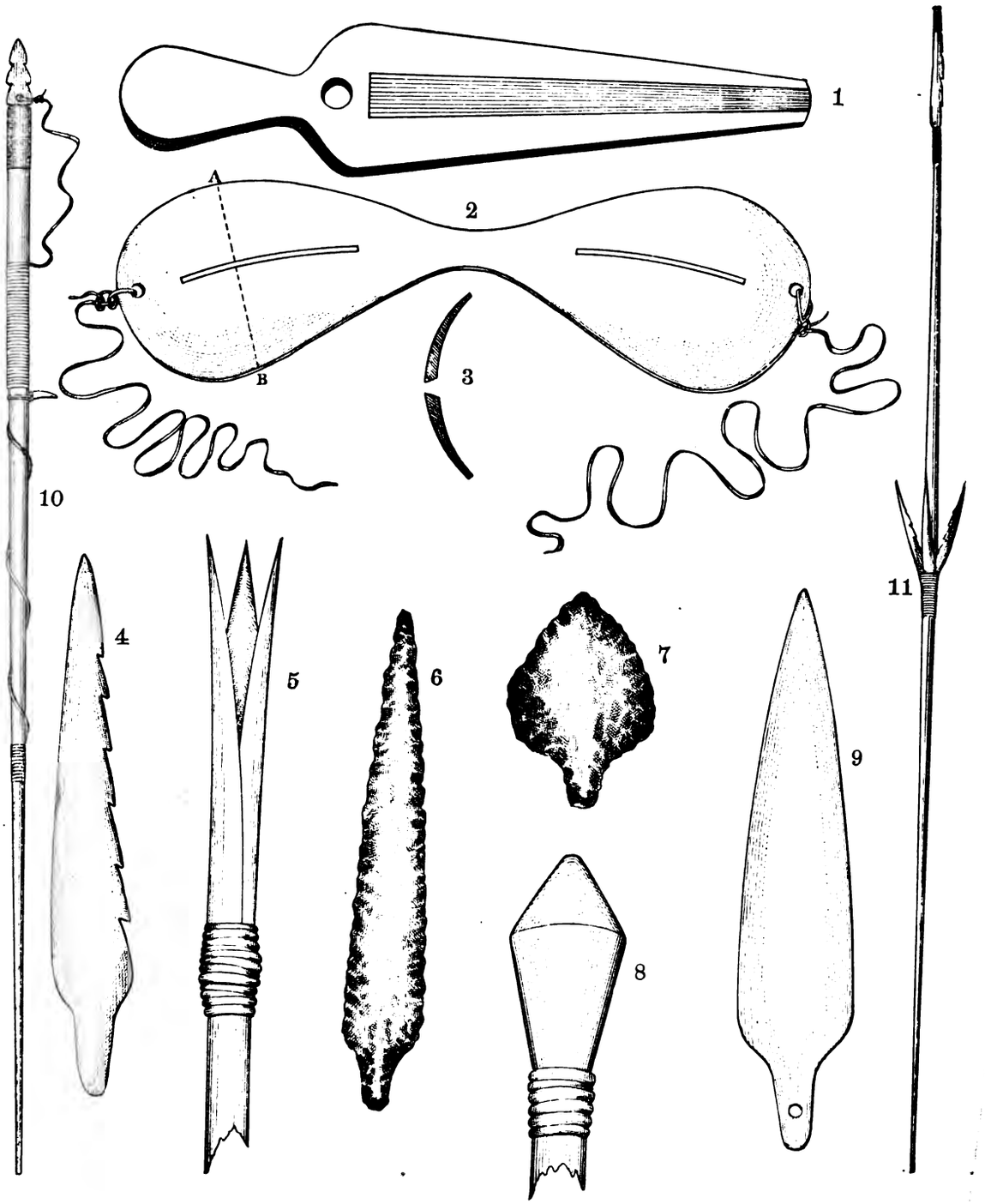

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PLATE II.—IMPLEMENTS OF THE CHASE (continued), NATIVES OF NORTHWESTERN ALASKA.

1. } Stone fish-hook × 2.
2. }
3. Snare for flying birds, one-third size.
4. Ivory fish-hook, natural size.
5. Fish-knife of slate, one-third size.
6. Detachable spear-head of ivory, one-fifth size.
7. Larch bow, re-enforced with sinew.

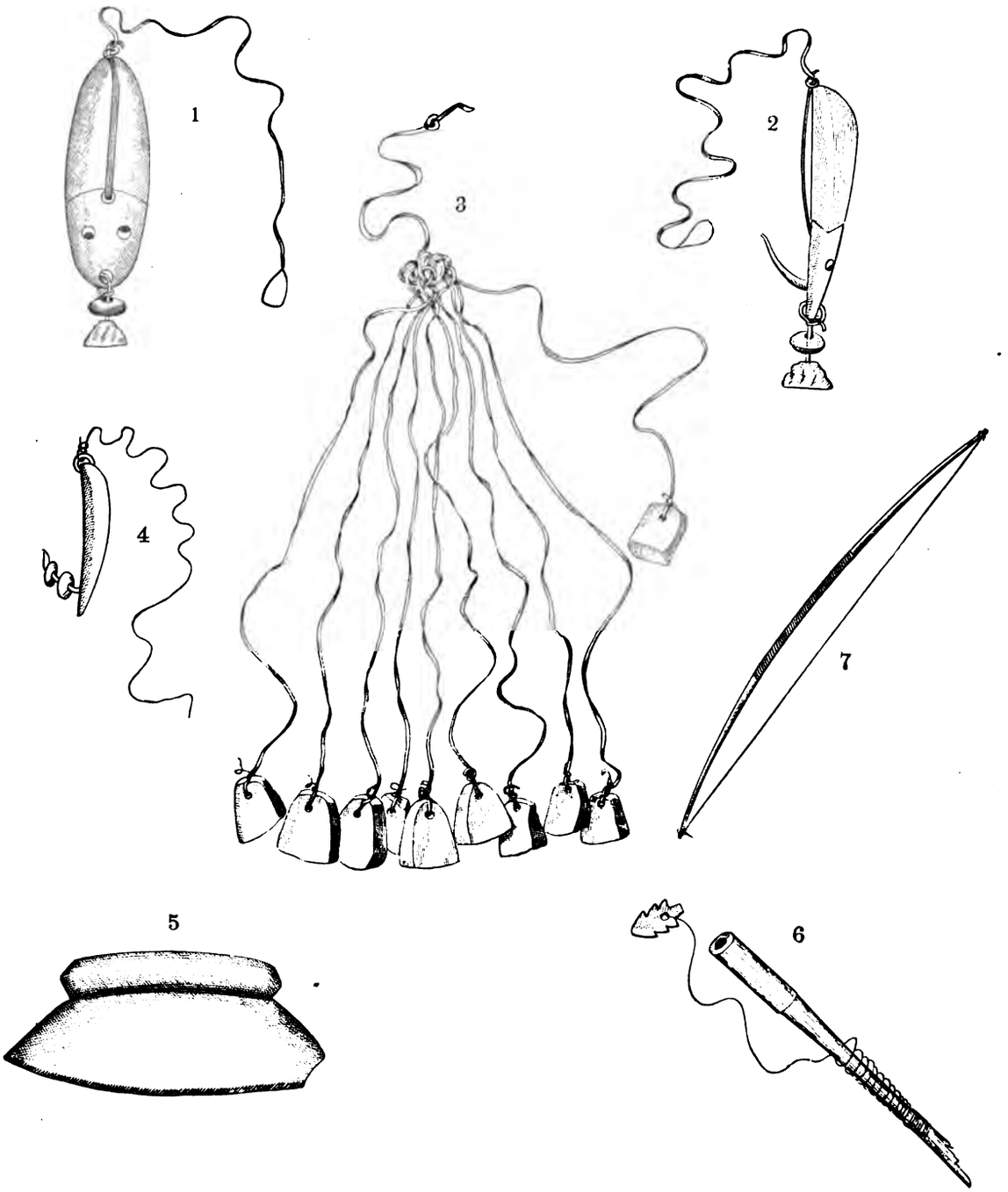
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PLATE III.—TRANSPORTATION AND LOCOMOTION, NATIVES OF NORTHWESTERN ALASKA.

1. Shoe of deer-skin with walrus-skin sole.
2. Shoe of walrus-skin with whale-skin sole.
3. Boot of hair-seal skin.
4. Boot of deer-skin ornamented with fur.
5. Shoe of fawn-skin.
6. Inner shoe or sock of tanned buckskin.
7. Snow-shoe.
8. Birch-bark canoe (Kowak River).
9. Sled (Kowak River).
10. Sled with ivory shoe (coast natives).

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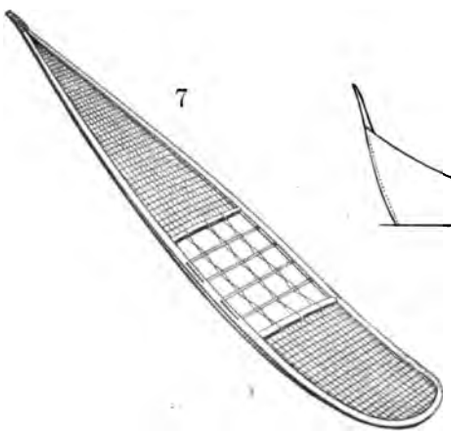

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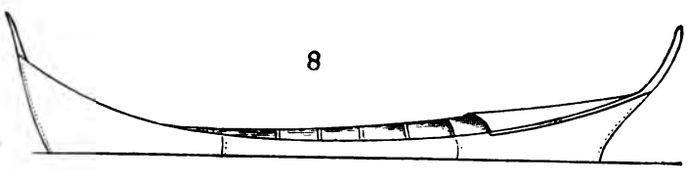

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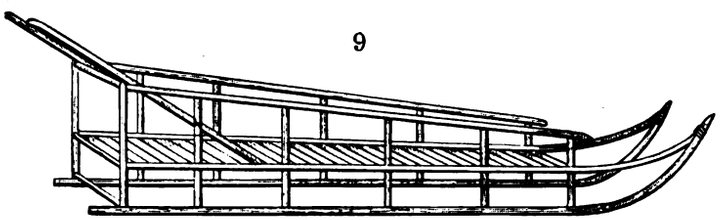

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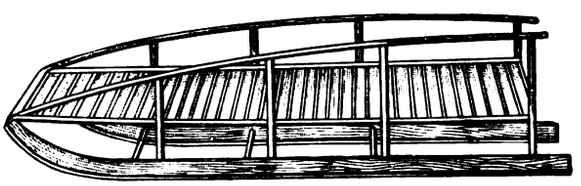

PLATE IV.—PIPES, NATIVES OF NORTHWESTERN ALASKA.

1. Primitive pipe without detachable bowl, one-fourth size.
2. Pipe, split stem and stone bowl, one-fourth size.
3. Pipe, split stem and brass bowl, one-fourth size.
4. Pipe, carved from soft wood, ivory mouth-piece, one-fourth size.
5. Pipe, split stem and jadeite bowl, steel pricker, one-fourth size.
6. Woman's pipe, brass bowl and split stem, one-fourth size.
7. Woman's pipe, inlaid stone and ivory bowl, split stem, one-fourth size.
8. Modern pipe, stem made of brass cartridge-shell, wood and rubber mouth-piece, one-fourth size.
9. Modern pipe, brass bowl, one-fourth size.
10. Modern pipe, brass bowl, stem made of cartridge-shells, one-fourth size
11. Inlaid stone and ivory bowl, with stem like 8, one-fourth size.
12. Modern pipe, stem like 10, ancient jadeite bowl, one-fourth size.
13. Modern pipe, brass bowl, slender split stem, one-fourth size.

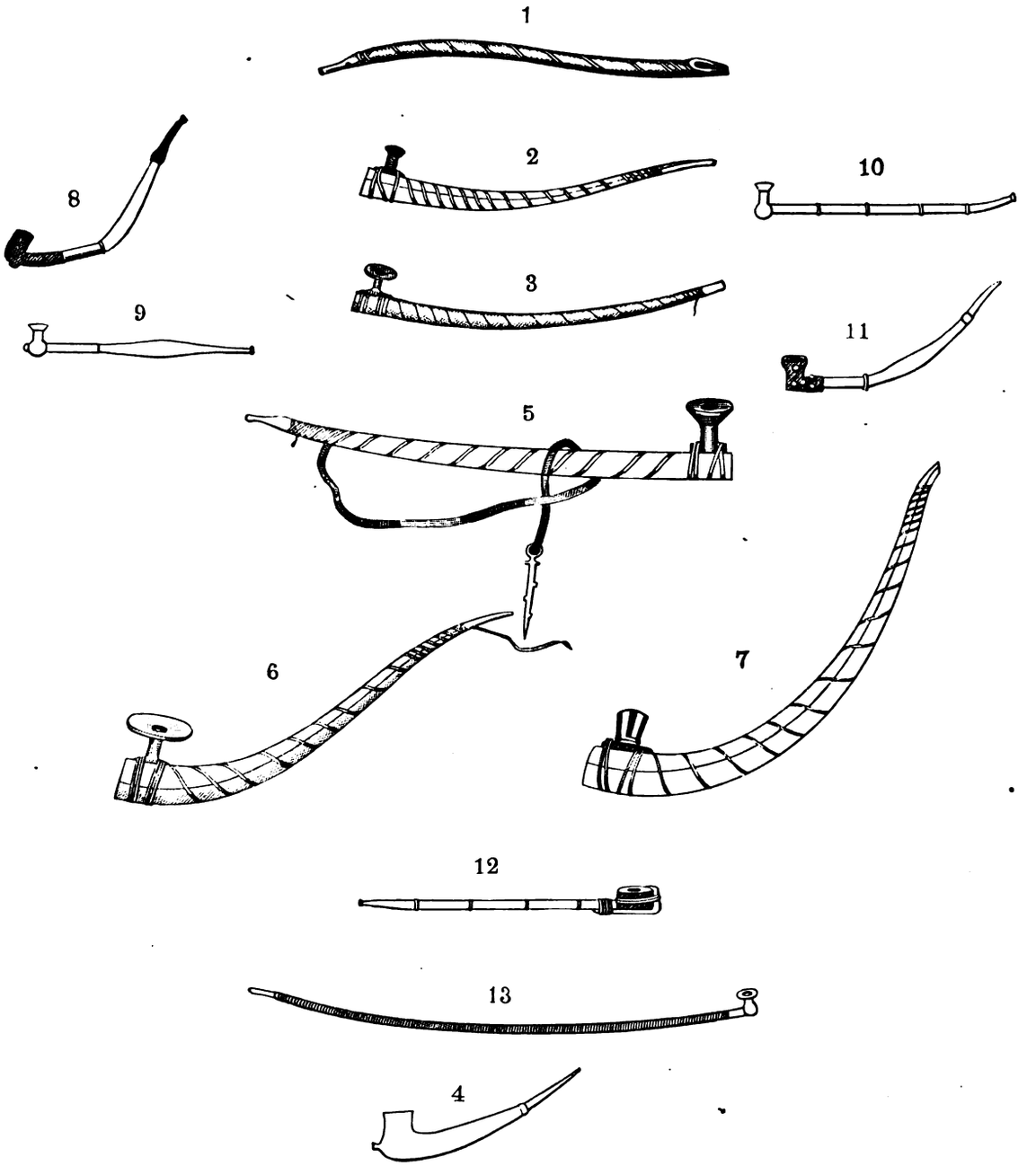
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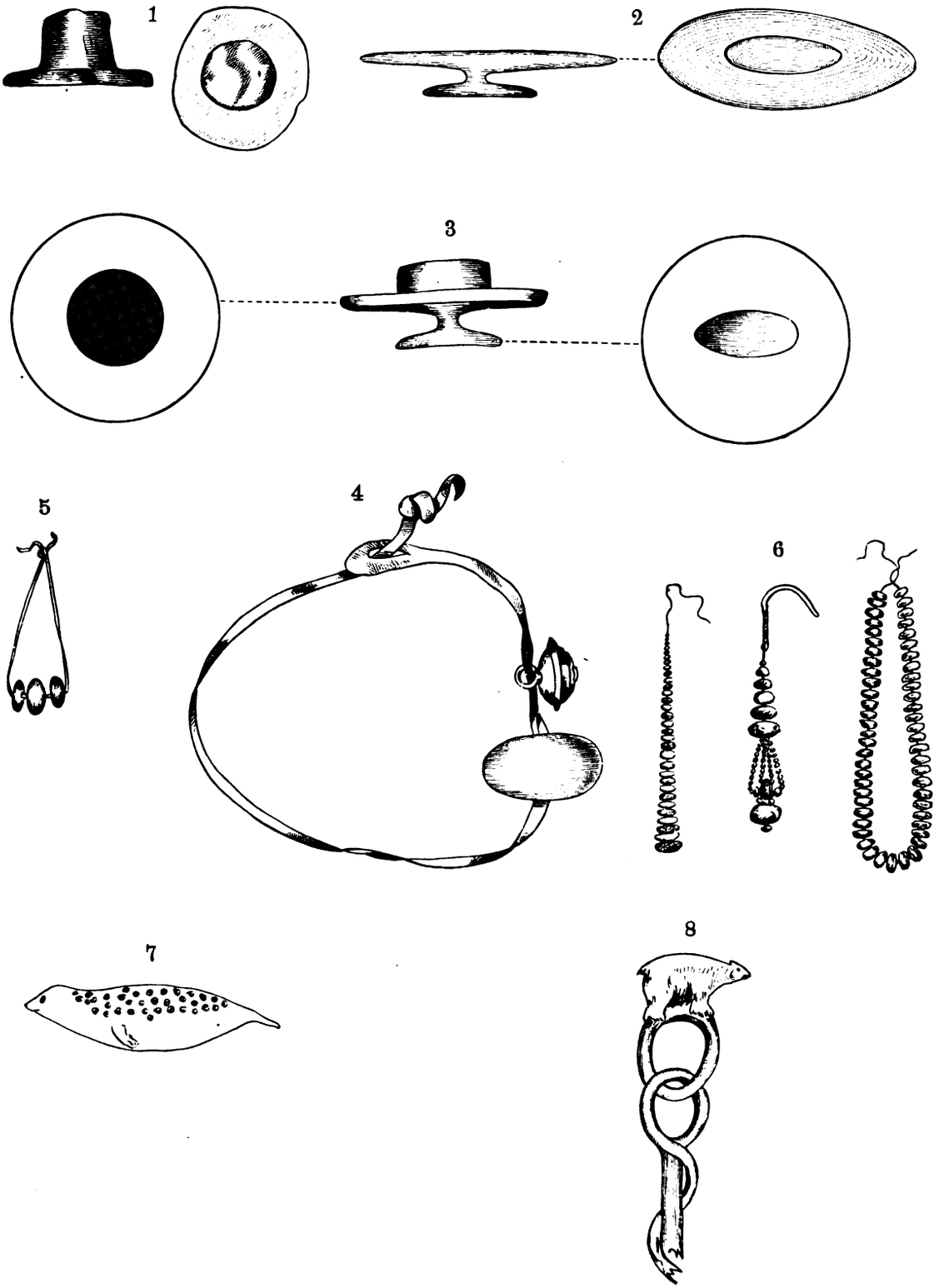
PLATE V.—LABRETS AND ARTICLES OF PERSONAL ADORNMENT, NATIVES OF NORTHWESTERN ALASKA.

1. Stone "plug" labret, common, natural size.
2. Jade "plug" labret, rare, natural size.
3. Ivory and colored glass labret, rare, natural size.
4. Bracelet (woman's) with button and glass bead, natural size.
5. Ornament for the nose.
6. Ear-rings, different-colored glass beads.
7. Inlaid ivory and whalebone seal, natural size.
8. Carved ivory handle.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EXPLORATION OF THE KOWAK RIVER, ALASKA.

NOTES ON THE NATURAL HISTORY AND RESOURCES.

BY

SECOND ASSISTANT ENGINEER S. B. McLENEGAN,
U. S. Revenue Marine.

1884.

ORDERS TO ASSISTANT ENGINEER McLENEGAN.

U. S. REVENUE MARINE STEAMER CORWIN,
Kotzebue Sound, July 8, 1884.

SIR: You are hereby detailed to accompany the expedition about to be sent from this vessel under the command of Lieut. J. C. Cantwell for the exploration of the Kowak River. In addition to any assistance which may be required of you by Lieutenant Cantwell in surveying the river, it will be your special duty to collect all the specimens and data possible in regard to the fauna and flora of the country, the character of the adjacent region, and in general all such information as will, in your opinion, be of value in the compilation of an exhaustive report of the exploration. Lieutenant Cantwell will afford you every facility for the performance of the above-mentioned duty consistent with the rapid advancement of the expedition; but you will at all times be subject to his orders as to the time requisite for this purpose. I can not too seriously call your attention to the importance of preserving in your relations with Lieutenant Cantwell the utmost harmony of action. Should, however, any difficulty arise it will be your duty to waive the matter until your return to this vessel, when it will be properly adjudicated. Any deflection from these instructions will meet with my severest condemnation.

Besides the above-enumerated duties you will collect as many specimens of the birds and fishes peculiar to this section as possible, carefully preserving the same, and turning them over to the proper authorities on your return.

With best wishes for the successful termination of the expedition,

I am, very respectfully,

M. A. HEALY,
Captain, U. S. Revenue Marine.

Second Assistant Engineer S. B. McLENEGAN,
U. S. Revenue Marine.

LETTER OF TRANSMITTAL.

U. S. REVENUE STEAMER CORWIN,
San Francisco, Cal., November 1, 1884.

SIR: In obedience to your order dated Arctic Ocean, July 8, 1884, detailing me for duty in connection with the exploration of the Kowak River, I have the honor to submit herewith the following notes.

In justice to myself I would respectfully state, in view of the circumstances under which I accompanied the expedition, that I was totally unprepared for an undertaking so comprehensive and important.

Very respectfully, your obedient servant,

SAML. B. MCLENEGAN,
Second Assistant Engineer, U. S. R. M.

Capt. M. A. HEALY,
Commanding Revenue Steamer Corwin.

THE KOWAK RIVER.

Opening inland by a narrow entrance from that great body of water in the Northwestern Arctic Ocean known as Kotzebue Sound is a sheet of fresh water called Hotham Inlet.

For the most part this inlet is extremely shallow. The entrance is guarded by vast mud-flats and sand-bars which are barely covered with water. The inlet is about thirty-five miles in length and from four to eight miles in width. It has a general trend from southeast to northwest. Its water is not influenced by tides, but a prolonged southeast wind causes a low stage.

Passing through the entire length of Hotham Inlet and into the waters of Kotzebue Sound is a well-defined river channel. The sea entrance to this is somewhat difficult to find. A vessel drawing from one to two fathoms can enter at the ordinary stage of water. In the inlet proper the channel has from two to four fathoms of water, and is comparatively easy to trace.

As we approach the head of the inlet the water gradually shoals. Near the lower or southern extremity a river known amongst the natives as the "Koowuk" enters the inlet through a large delta. It is very shallow here, and shoals covered with from two to four feet of water extend far out into the inlet. In crossing the bar it is somewhat difficult to find a channel of sufficient depth. When fairly between the banks of the river, however, there is an abundance of water. This varies from two to five fathoms.

The delta is a low tract of land covered with a series of marshes, lakes, lagoons, and a thick growth of willows. Above the delta, which extends for about ten miles, the river widens out into a stately stream, on which large steamers might safely ride.

The existence of this river was undoubtedly known to Captain Beechy as far back as 1826 and 1827. Since his time, however, little or nothing was learned concerning it, except from the reports of Surgeon John Simpson, R. N., in 1848.

Capt. E. E. Smith informs the writer that he ascended that river a few miles in the year 1874. During the summer of 1883 Lieut. George M. Stoney, U. S. Navy, then a passenger on the revenue steamer *Corwin*, in a boat manned by Captain Healy from the *Corwin's* crew, went about fifty miles up the river. The word *Koo* or *Kū* in the dialect of nearly all these northern Eskimos signifies river, and the suffix *wūk*, *pūk*, or *būk* means large or big. Hence the native meaning of Kowak or Kūăk, as some authorities spell the name, is Big River.

For a distance of fifty miles above the delta the adjacent region is a level stretch of tundra. Along the river banks, and extending a short distance in, there is a sparse growth of timber consisting principally of spruce. Above this point there is a gradual change into a hilly, broken, and partly timbered country. In this section we find the coal belt of this region.

During the spring freshets a very high stage of water prevails. Along the banks and among the adjacent timber evidences are everywhere visible of the havoc wrought by the ice. Large trees are uprooted and smaller ones are ridden down. Great furrows are ploughed in the banks, and masses of earth are undermined and carried away. Along the lower river there are several miles of ice cliffs similar to those at Escholtz Bay. These rise to a height of two hundred feet above the river. Detached masses are constantly falling into the river, rendering a near approach

exceedingly dangerous. At this point a strong current sweeps directly under the cliffs, and it is necessary for purposes of navigation to keep well out in the stream. Masses of earth and quantities of timber are being undermined and precipitated into the river.

The source of the vast shoals in Hotham Inlet is now apparent, and it seems probable that in time the inlet will cease to exist.

After passing through the foot-hills the river enters a mountainous region. On either bank the country has a gradual slope from the mountains. The ranges, which are somewhat broken, rise from two to three thousand feet above the sea.

For a distance of fully 250 miles there are from two to five fathoms of water in the channel. Above this point the river shoals and the current becomes very strong. During high water the channel is obscure in places; at a lower stage it is well defined and its navigation comparatively easy. In regard to the headwaters of the river the writer can not speak from observation. The natives say that the current is very strong and that it is impossible to stem it. The channel is said to have many dangerous rocks, and frequent portages are necessary to avoid rapids.

It is said that a portage can be made to an unknown river flowing into the Yukon. It is also supposed that a short portage can be made to the Colville River, which flows into the Arctic near Point Barrow.

There are many interesting problems to solve in Arctic Alaska. It will not be the work of weeks or even months, but years of arduous and incessant labor will be required for the successful accomplishment of this duty.

TIMBER.

The valley of the Kowak above the delta is pleasantly diversified with forests and plains, thus unfolding to the eye new scenes of quiet beauty as we journey up-stream. The forests are made up of white spruce, birch, poplar, and cottonwood. The timber shows more or less climatic repression. The spruce seldom attains a diameter exceeding eighteen inches and is stunted in growth. This species forms the great bulk of the timber in this region.

FISH.

The river abounds in fish, among which the salmon is the most common and desirable species for native use. Coregonus, pickerel, grayling, and trout are frequently seen; the latter two species taking the hook readily, formed an agreeable change from our monotonous diet of ship stores. The salmon run begins in July and lasts through until the end of the spawning season. During this time the natives are busy laying up a supply of this fish, which constitutes their chief means of subsistence during a portion of the long winter months.

In order to arrive at any definite conclusion as to the value of the fish product of this region it would be necessary to obtain observations covering a series of years, as the duration of the run and quantity of fish entering the river varies greatly from year to year.

MINERAL RESOURCES.

COAL.

In the lower river region, about seventy-five miles above the mouth, we found extensive deposits of coal. Our attention was first directed to this matter by the large masses of conglomerate rock along the river banks. Wherever this formation is found we have discovered deposits of coal.

The coal belt in this region is about thirty miles in width, and it passes through a series of high, rolling, and partly timbered hills. In many places the veins crop out along the water's edge, and during the spring freshets large quantities are detached and washed down into the bed of the river.

The outcrop is seldom free from slaty impurities. Notwithstanding this, we obtained a uantity of remarkably pure specimens. It is jet-black in color. and of a soft, friable texture.

All the coal in this region is of a lignite composition, which is the most recent formation of the coal series. In many respects the product resembles that of the well-known vein near Cape Lisburne. The latter is undoubtedly the northern termination of the Kowak River vein, and it affords an interesting study in tracing the coal belt of Alaska. Below the coal formation we found extensive deposits of fire-clay. This material is used to a limited extent among the natives for the manufacture of rude earthenware.

The deposits of clay existing here are mostly of a fatty nature, which is a serious objection to its use. When subjected to heat the shrinkage is apt to cause a fracture. The addition of sand, however, will in a measure remedy this.

GOLD.

In regard to the existence of gold in this region there seems to be no doubt. In almost every stream, large and small, we found the color of gold, and if this be an indication this precious metal undoubtedly exists in some sections of this country. Gold never exists in the secondary or coal-bearing formation, hence we may look for it in vain along the lower river.

Admitting its existence in northern Alaska, the question arises whether it can be profitably mined. Since the acquisition of the Territory the southeastern portion has been well prospected. More recently miners have penetrated the vast region drained by the Yukon, and many have journeyed down that river to the sea.

Thus far the results obtained have not been flattering, and but little encouragement is offered for further work in this region. Miners, while they admit the existence of gold there, assert that it can not be mined at a profit. The character of the country, its remoteness from a base of supplies, the long winters and the short summers, are detrimental to mining of any description.

It is possible that with the richest ores quartz mining might be successfully carried on. Again, with large quantities of free gold, placer mining might prove remunerative, but as far as known at the present time nothing of the kind is to be found in Alaska.

It is not probable that the experience of others will deter miners from prospecting there in the future. It is believed, however, that if the situation were better known miners might save both time and money and avoid inevitable disappointment.

GREEN STONE.

Among the natives of Arctic Alaska there is found a peculiar green stone. In former times large quantities were used for the purpose of making axes, spear and arrow heads, as well as ornaments and articles of domestic use. The stone thus employed was of various shades of green, some being dark and opaque, while others were light and translucent. There seemed to be no uniformity in this respect, but the latter varieties were not found in abundance.

The stone has always been greatly esteemed by the natives. The greater portion of the green-stone implements found among them at the present time are undoubtedly very old, and have been handed down as heirlooms from one generation to another.

The stone has been popularly called malachite, jade, and various other names, none of which terms are correct. All the finer translucent varieties are nephrite. This is a hard, compact mineral, generally of a dark green color. Among certain races it was worn as a charm for the cure of kidney diseases, from which fact the name is derived.

Large quantities of nephrite were brought from Peru and Mexico in the shape of carved ornaments at the time of the Spanish conquest.

For many years attempts have been made to find the source of this stone in Alaska. The natives themselves apparently know very little concerning it, which fact indicates the ancient origin of the nephrite implements. Indeed we have every reason to believe that they are the work of a past generation. The existence of this stone is well known to the natives, but they are reluctant to give any direct information concerning it.

At a distance of 120 miles above the mouth of the river a range of mountains was pointed out to us in which the stone was said to exist. The range, which was rather isolated, towered considerably above the surrounding mountains. It is about thirty miles in length and has a general

trend from east to west. The highest mountains, as first remarked, are about three thousand feet above the sea.

It appears that these mountains have never been visited by the natives. There are many superstitions connected with them, and in consequence of this fact none of their number could be induced to accompany us as guides.

On the eastern end of the range there are cliffs of serpentine rock. This is of a dusky green color. Serpentine has a pecular mottled appearance, not unlike a serpent's skin, from which fact it derives its name. It is quite soft and can be easily polished. Among the river natives were found two or three axes of this material. These were all rude affairs, however, and bore no resemblance to the old nephrite implements.

Near the western end of the range we found quantities of a light green rock. This is very hard and compact, and bears no resemblance to the serpentine formation. The exact nature of this rock is unknown. It resembles jade in color, but lacks the granular structure. It lacks the translucent nature of nephrite, although some specimens exhibited this peculiarity to a certain extent. The stone is possibly an imperfect nephrite. The latter is never found in quantities—generally in "pockets" only—although nothing of the kind came under our observation.

Nephrite was undoubtedly obtained in these mountains. The exact place, however, is unknown to the present generation of natives.

I am indebted to Mr. W. H. Melville, of the U. S. Geological Survey, for analysis of rock, and other favors, for which I desire to return thanks.

THE FUR TRADE.

In the Kowak River region the fur trade is of local importance only. The few hundred skins which are annually brought down to the coast are comparatively insignificant in value, and in the end are productive of more evil than good to the native inhabitants.

It is impossible to gather any statistics showing the value of the production. It is believed, however, that the annual product does not exceed ten thousand dollars in value.

The most valuable peltry to be obtained in this region is the silver-gray fox. The skin is worth about ten dollars in trade to the natives, but in the San Francisco market it is worth from two to three times that amount. The beaver is found sparingly here, and the fur, although in demand, has not a high value. The peltry can be obtained for about a dollar in trade.

The land otter is found more or less commonly throughout the interior. The fur is justly esteemed in the market, and by many it is considered equal to the fur-seal. The fur is thicker and heavier than the latter and certainly much more serviceable. It can be obtained for about two dollars in trade.

The marten is found abundantly in the mountain districts. In former times it was one of the most important and valuable skins in the market. At the present time, owing to the caprice of fashion, there is little demand for it. It is worth about one dollar in trade.

In addition to those mentioned, the red, white, and cross fox, bear, wolf, lynx, and reindeer are found abundantly in this region, and their skins are a staple article of trade. There are no trading stations in this region. The bulk of the production is brought down to the shores of Kotzebue Sound, and a market is found on board the numerous vessels that visit this region.

There is an excellent opportunity for the establishment of a trading station at this point, and the enterprise would undoubtedly prove remunerative. Under the present lack of system the trade is injurious and demoralizing to the natives.

There are certain furs which can not be obtained except for rifles or whisky. Large quantities of both were brought into Kotzebue Sound during the past summer by the Diomede and Cape Prince of Wales natives, who obtained them on the Siberian coast.

The sooner the limited demand for rifles can be legitimately supplied the sooner will the horrors of the whisky traffic cease.

EXPLORATION OF THE KOWAK RIVER, ALASKA.

ORNITHOLOGICAL NOTES.

BY

SECOND ASSISTANT ENGINEER S. B. McLENEGAN,
U. S. Revenue Marine.

1884.

INTRODUCTORY LETTER.

The territory drained by the Kowak River comprises a portion of Alaska lying north of the Arctic Circle, and is a region heretofore unknown to explorers. With the exception of the immediate vicinity of the river mouth, the entire region is mountainous. Forests of spruce, white birch, poplar, and cottonwood are found along the river banks, and the open portions are covered with a luxuriant growth of vegetation.

The following ornithological notes, collected during a reconnaissance of the river, are incomplete. Inasmuch as all, or nearly all, the birds are migratory during the winter months, the discovery of new species was not to be expected. It is believed, however, that the present paper will give a good idea of bird life in that region. Other species will undoubtedly be added to the list when further research is made. The Strigidæ, Falconidæ, Scolopacidæ, and Anatidæ, enumerated in the present paper, are not a complete list. In certain instances where doubt existed, and no specimens were obtained, the bird has been excluded from the list.

The geographical distribution of several species has been enlarged, and in other cases the northern limit has been established. The ornithology of Alaska is far from complete, and it is believed that any addition will be welcomed by naturalists.

SAMUEL B. MCLENEGAN,
Assistant Engineer, U. S. Revenue Marine.

SAN FRANCISCO, CAL., *October* 31, 1884.

BIRDS OF THE KOWAK RIVER.

TURDIDÆ. THRUSHES.

1. Hylocichla alicise *Baird* [3].* THE GRAY-CHEEKED THRUSH.

Among the tangled and almost impenetrable forests of the interior we often hear the sound of sweet melody. As we stop almost involuntarily and listen to the clear, sweet tones our tired frame seems quickened into a new life. Like the weary traveler who kneels over the clear spring to quench his thirst in the cool waters below, we feel revived. The feeble pulse becomes stronger, the eye becomes brighter, and we listen with bated breath to the strange melody in the forest.

To one unacquainted with this charming songster it would be difficult to describe him. Although clad in a plain coat, the thrush has no rival among the feathered choristers.

From the inner shores of Hotham Inlet, where the willow and alder bushes extend to the water's edge, throughout the region of the Kowak River the thrush is an abundant species.

It arrives in this latitude early in June, and during the mating season the forests resound with its melody. The nest, a loosely constructed affair, is generally placed in a low bush and contains five eggs. After the young birds appear the thrush is seldom heard, and the song is reduced to a single note. Later in the season the thrush becomes silent, and early in September it leaves for the south.

2. Merula migratoria (*Linn.*) *Sw. and Rich.* [7]. THE AMERICAN ROBIN.

To one who is familiar with the robin in the lower latitudes, how strangely out of place does he appear in the dreary regions of the north! What memories are awakened on hearing the familiar strain, and how readily does the mind wander back to the more pleasant scenes and surroundings of the lower latitudes!

Throughout the timbered portion of this region the robin, although not an abundant species, is a regular summer resident. It seldom visits the tide-water coast in this latitude. I saw a pair at the head of Hotham Inlet in August, but it is doubtful whether it breeds there, as the shelter is hardly sufficient. It undoubtedly ranges throughout northern Alaska, and in the wooded interior it rears its young far above the Arctic Circle.

PARIDÆ. TITMICE.

3. Parus cinctus *Bodd.* [44]. THE SIBERIAN CHICKADEE.

This active little wood sprite is more or less common throughout the wooded interior. The chickadee is one of the few species that brave the Arctic winter. Its enlivening presence does much to relieve the dreariness of the forest. It seldom or never approaches the sea-shore in this latitude. The absence of its natural home, the trees, excludes it from the coast region.

* The nomenclature is that of Mr. R. Ridgway's "Nomenclature of North American Birds," Bulletin No. 21 of the U. S. National Museum.

4. Parus hudsonicus *Forst.* [45]. HUDSONIAN CHICKADEE.

Like the preceding, this species is a permanent resident in the wooded interior. I have often watched this busy little worker, ever cheerful and active, as it plays hide-and-seek among the tall spruce trees; but never finding it in my heart to raise the deadly gun. How strange it is that it should prefer the cheerless regions of the north, enduring its cold and famine, to the more pleasant scenes in the lower latitudes. But we are ever reminded that He feedeth the sparrows, and not one falleth to the ground without his notice.

SYLVICOLIDÆ. WARBLERS.

5. Helminthophaga celata (*Say.*) *Baird.* [86]. THE ORANGE-CROWNED WARBLER.

This warbler is quite common in the Kowak River region. During the early part of July these birds were apparently numerous along the river; but about the middle of August not an individual was seen. It nests in the thick bushes on the banks of the river, and, like many of the smaller birds, it leaves very early in the fall.

6. Dendroeca æstiva (*Gmel.*) *Baird.* [93]. THE SUMMER YELLOW BIRD.

Throughout northern Alaska, especially along the level stretches of tundra and among the bushy tracts lying along the river banks, this handsome little warbler is found in abundance. The alder and willow-lined shores of Hotham Inlet and the adjacent region afford a congenial haunt for these birds. This is the only locality in which they approach the sea-shore in this latitude.

7. Dendroeca coronata (*Linn.*) *Gray.* [95]. THE YELLOW-RUMP WARBLER.

Unlike the preceding, the Yellow-Rump is found exclusively in the wooded interior, and its appearance on the sea-coast may be regarded as accidental. I saw three specimens only of the present species, and I am inclined to think that it is an uncommon resident in this region.

8. Dendroeca striata (*Forst.*) *Baird.* [101]. THE BLACK-POLL WARBLER.

The Black-Poll, like its preceding relative, is confined chiefly to the wooded interior. Occasional specimens are seen on the shores of Hotham Inlet, where the dwarf alder offers some attraction. It is more abundant than the preceding, and undoubtedly breeds in this region.

9. Myiodioctes pusillus (*Wils.*) *Bp.* [125]. THE BLACK-CAPPED YELLOW WARBLER.

Like its relative, the Yellow Warbler, the present species is more or less common in the Kowak River region. The Black-Cap is seldom found in the wooded interior. Among the bush covered lowlands, or even on the open stretches of tundra, it is an abundant species. It is chiefly inland in distribution; and according to my observation it is very uncommon along the coast.

LANIIDÆ. SHRIKES.

10. Lanius borealis *Vieill.* [14]. THE GREAT NORTHERN SHRIKE.

The Northern Shrike, although seldom or never found in abundance in any locality, was noted on several occasions, and specimens were obtained. The present region is the highest latitude in which the shrike has been obtained in Alaska; and it adds considerably to the bird's known range. I saw several pair of shrikes along the river; and although no nests were obtained, the bird undoubtedly breeds in this region.

HIRUNDINIDÆ. SWALLOWS.

11. Hirundo erythrogastra *Bodd.* [154]. THE BARN SWALLOW.

What a pleasant surprise to the traveler in these northern regions to meet his old friend, the swallow! How easily does the mind wander back to the scenes of other days, and recall the delight with which we welcomed this harbinger of spring!

Throughout the present region the Barn Swallow is a common species. Among the deserted winter huts of the natives I found it nesting in abundance. After the nesting season we find it everywhere along the river, or skimming over the marshy sections lying on either side. The latter part of August these birds collect in flocks and leave for the southern climes.

12. Tachycineta bicolor (*Vieille*) *Caban.* [155]. THE WHITE-BELLIED SWALLOW.

Along the entire river, wherever the banks afford the proper nesting-place, this species is found in abundance. This little swallow, skimming over the water and darting hither and thither in search of insect prey, is a sight which must interest the most indifferent lover of nature. The swallow arrives here early in June, and nests towards the close of the same month. I think that both this and the preceding species are found in every part of the interior north of the Circle.

FRINGILLIDÆ. FINCHES.

13. Ægiothus canescens exilipes (*Coues*) *Ridgw.* [178*a*]. THE WHITE-RUMPED REDPOLL.

Throughout this portion of Alaska, especially along the level stretches of tundra, or among the dense thickets bordering on the river, this is a very common species. Both this and the following species are permanent residents in these latitudes. During the severe months of winter, however, there is frequently a partial migration.

The White-Rump nests wherever found in this region. The nest is generally placed upon a concealed tuft of grass, and usually contains four eggs.

14. Ægiothus linaria (*Linn.*) *Caban.* [179]. THE COMMON REDPOLL.

Like its relative just mentioned, the Redpoll is a widely distributed species. In the present region, however, it is more uncommon than the preceding. The range and general characteristics of the Redpoll are essentially the same as those of the preceding species. No nests were found in the Kowak region, although this bird undoubtedly breeds there.

15. Plectrophanes nivalis (*Linn.*) *Meyer* [186]. THE SNOW BUNTING.

In the desolate regions of the far north, and doubtless on lands yet undiscovered, the Snow Bunting is a summer resident. It is never found in a timbered district, but on the vast plains of tundra; on the barren hill-tops and rugged mountains we find it imparting life to the desolate landscape.

The Snow Bunting is found to a limited extent only in the Kowak region. I have never seen the nest here. It is much more abundant on the coast than in the interior.

16. Centrophanes lapponicus (*Linn.*) *Caban.* [187]. THE LAPLAND LONGSPUR.

The Longspur is one of the most abundant species in the present region. On the moss-covered hills or the vast plains of tundra we find it in the greatest abundance. During the mating season the Longspur is one of the few musical birds in these latitudes, and its handsome form and lively notes impart much life to the otherwise desolate regions.

It has much of the sunny disposition and exuberance of song peculiar to the bobolink, and its habits are almost exactly the same. It reaches this latitude early in June. The nest is generally placed on a tuft of grass or a sheltered knoll. It is a loosely-constructed affair, consisting principally of grass, and usually contains four grayish-brown eggs.

17. Zonotrichia gambeli intermedia *Ridgw.* [207*a*]. THE INTERMEDIATE WHITE-CROWNED SPARROW.

Among the bushy tracts along the river banks the White Crown is a common summer resident. It is one of the earliest spring arrivals in this latitude. The snow has scarcely left the thickets, or the young buds opened to the genial warmth of spring, before our friend has arrived from the lower latitudes.

This species takes a deservedly high rank among the feathered choristers; and during the days succeeding its arrival the notes can be heard on every hand. The nest of the White Crown is generally placed in a bush, or sometimes a tall weed is selected for this purpose. I have found the nest and young early in July; but a month later the nest is deserted.

18. Zonotrichia coronata (*Pall.*) *Baird* [208]. THE GOLDEN-CROWNED SPARROW.

On the inner shores of Hotham Inlet, among the dense thickets of alder, the Golden Crown is a sparing summer resident. It is generally found in company with the preceding species, which, however, largely outnumbers this. I have never seen the nest in this latitude, although the bird undoubtedly breeds here.

19. Spizella montana (*Forst.*) *Ridgw.* [210]. THE TREE SPARROW.

One of the earliest arrivals in northern Alaska is the Tree Sparrow. Long before the snow has disappeared from its haunts, or the young buds have begun to swell, our little friend has reached its northern home, and with bustling activity makes its arrangements for the season. Without wasting any time in musical efforts he secures a mate, and soon the pair is busily engaged in the duties of the season.

Notwithstanding his name, the Tree Sparrow seldom or never resorts to the forest. It is found almost invariably in the bushy thickets, or even in the more open sections of the country. It is very common in the Kotzebue Sound region, and is equally abundant throughout the interior. Although of limited musical power, its familiar form imparts life to the otherwise desolate portions of the country.

20. Passerella iliaca (*Merrem*) *Gm.* [235]. THE FOX-COLORED SPARROW.

Among the feathered choristers of the northern forests we sometimes hear one whose clear, sweet tones rise with distinctness above the others. As the clear notes of the leader's violin are heard in an orchestra, so, too, are the notes of the Fox Sparrow heard in the orchestra of nature. While it has not the wild exhilerating melody of the thrush, it is more soothing and restful, and it dispels our sense of loneliness in the desolate forest.

In the far interior the Fox Sparrow is not an abundant species, but along the alder-lined shores of Hotham Inlet and the lower river region they are very common. In this latitude the Fox Sparrow arrives early in June, and soon after the cares of the season begin. After the young birds appear, our friend, absorbed in its new duties, is seldom heard.

The latter part of August, when the chilly winds and lengthening nights foretell the coming winter, the Fox Sparrow, along with many of the smaller birds, prepares to return to his southern home.

ICTERIDÆ. BLACKBIRDS.

21. Scolecophagus ferrugineus (*Gm.*) *Swains* [473]. THE RUSTY BLACKBIRD.

In the Kowak River region, and doubtless throughout Arctic Alaska, the Rusty Blackbird is a common species. The sight of our chattering, rollicking friend in these far northern regions carries the mind back to more pleasant scenes and surroundings. The eye misses the budding trees, the sprouting fields of grain, the waving corn, and soon the reality of our position comes home to us. The blackbird seems to lose much of his careless good-nature here, and we miss the chattering medley of song so familiar in his southern home. We seldom find him in the spruce forests. He seems to have a preference for the more open birch timber, or the bushy tracts lying along the river banks. It nests here early in June, and about the first of September the birds collect in small flocks and leave for their southern home.

CORVIDÆ. CROWS, RAVENS.

22. Corvus corax carnivorus (*Bartr.*) *Ridgw.* [280]. THE AMERICAN RAVEN.

The above-named species is more or less common in the present region. Unlike its kind on the Aleutian Islands, it is extremely shy, and is seldom found in the vicinity of the native settlements. The crow nests in the spruce forests throughout the river country; but as we approach the sea-coast it is much less abundant.

After the nesting season is over, and the young birds are fully fledged, the crow is found abundantly along the exposed sand-bars in the river. There, in company with the gulls, it indulges its fish-eating propensities to the fullest extent. It is abundant, also, in the vicinity of the deserted fishing camps of the natives, where it performs very necessary scavenger service. Although the crow is considered a permanent resident of Arctic Alaska, there is a partial migration during the severe months of winter.

23. Pica rustica hudsonica (*Scop.*) *Baird* [286]. THE BLACK-BILLED MAGPIE.

One specimen in the collection from Hotham Inlet or Kowak River.

24. Perisoreus canadensis fumifrons *Ridgw.* [297 *b*]. THE SMOKY-FRONTED JAY.

In the central and southern portions of Alaska the jay is an abundant species; but its range within the Arctic Circle seems to be very limited. In the present region but three specimens were seen, and I am inclined to think that it is very rare in this latitude.

It is found principally in the bushy growth along the river, in which place they exercise a species of kukluxism among the smaller birds. It is very shy, and I found it difficult to approach within gunshot. I have never seen it in the Kotzebue Sound region, and its occurrence on the sea-coast may be regarded as accidental.

PICIDÆ WOODPECKERS.

25. Picus pubescens *Linn.* [361]. THE DOWNY WOODPECKER.

Although common in the central portions of Alaska, in the Kowak region I found this a very rare species. The only specimens coming under my notice were about three hundred miles above the mouth of the river. I have never seen it in the vicinity of Hotham Inlet, and am inclined to thinks its occurrence there very unusual. The dwarf growth of willow and alder is unsuitable for nesting places, and if found there at all it is undoubtedly a straggler from the interior.

26. Colaptes auratus (*Linn.*) *Sw.* [378]. THE YELLOW-SHAFTED FLICKER.

The only record of the present species in this region rests upon a single specimen seen in the upper river region. Although I made special efforts to find this bird, save in the above-mentioned instance none came under my observation. It would appear that the *Picidæ* represented by this and the preceding species are uncommon, if not rare, in Arctic Alaska. The question should remain unsettled, however. The necessary haste with which the writer's observations were made leaves room for doubt in some instances in regard to the exact abundance of certain species.

ALCEDINIDÆ. KINGFISHERS.

27. Ceryle alcyon (*Linn.*) *Boie.* [382]. THE BELTED KINGFISHER.

Along the waters of the upper river this well-known bird is quite common, and it is undoubtedly a regular summer resident of this region. The kingfisher is confined exclusively to the water courses of the interior and it seldom approaches the coast in this latitude. During the past two years I have never seen a specimen in the Kotzebue Sound region. It is possible that during the migrations an occasional specimen may be found there. But the absence of the natural home of the kingfisher renders its occurrence there very improbable.

The present record adds considerably to the known range of the kingfisher.

STRIGIDÆ. OWLS.

28. Ulula cinerea (*Gmel.*) *Bp.* [399]. THE GREAT GRAY OWL.

In the dense spruce forests of the interior the Gray Owl is a well-known resident. It is confined to the timbered portions of the country. I have never seen a specimen in the vicinity of the coast, and it is doubtful whether that treeless section has any attraction for it. The nest of this species consists of a rude mass of sticks, generally placed in the top of a spruce tree. Like most of the *Strigidæ*, the Gray Owl is a permanent resident of this region, and the same nest is used year after year. During winters of exceptional severity there is frequently a partial migration to the lower latitudes.

29. Nyctea scandiaca (*Linn.*) *Newt.* [406]. THE SNOWY OWL.

Throughout every portion of Alaska known to man the Snowy Owl is a well-known resident. Although it is never abundant in any locality, I saw it frequently along the river. Perched upon a rocky eminence, a tall spruce, or even a fragment of drift-wood, this noble species is a conspicuous figure. It is very shy, however, and great skill is required to circumvent it.

Unlike the preceding species it is common on the coast. Here we find it on the hills or even among the drift-wood along the beach.

It nests principally in the wooded interior, although a cliff is often chosen for that purpose. Like the preceding, the Snowy Owl frequently migrates during the severe months of winter.

30. Surnia funerea (*Linn.*) *Rich. and Sw.* [407]. THE AMERICAN HAWK OWL.

This handsome species seems to be irregularly distributed in the Kowak region. Two specimens were shot at Hotham Inlet, but in the wooded interior none came under my observation.

As the name indicates, the Hawk Owl has some of the characteristics of the *Falconidæ*, and possesses much of the latter's boldness and daring. While in camp at Hotham Inlet a striking instance of this occurred. About dusk in the evening, as one of the party was returning to camp, a Hawk Owl darted from a neighboring thicket, seized the cap from his head, and was beating a hasty retreat with its novel prize. Before the owl had proceeded far, a well-directed shot brought down the retreating marauder. I have never been able to decide whether the act was one of pure courage or a superabundance of audacity, but at all events it cost the brave bird its life.

FALCONIDÆ. HAWKS.

31. Hierofalco gyrfalco sacer (*Forst.*) *Ridgw.* [412*b*]. MACFARLANE'S GYRFALCON.

The present species is one of the most widely distributed and abundant birds of prey in this region. A pair or more can be seen circling overhead in any bold portion of the interior. It breeds here early in June. The nest is placed in a tall spruce or upon a rocky eminence along the river banks, and two or three eggs are the usual complement.

32. Æsalon columbarius (*Linn.*) *Kaup.* [417]. THE PIGEON HAWK.

In this latitude the Pigeon Hawk is confined to the wooded interior. I have never met any specimens along the Arctic coast. In the Kowak River country, however, it is not uncommon. I saw the nest and young in the mountain districts, and shot a pair on the banks of the lower river. This is the only record I have in the present region. While these data are hardly sufficient evidence, I believe that it is a regular summer resident of northern Alaska.

33. Circus hudsonius (*Linn.*) *Vieill.* [430]. THE MARSH HAWK.

On the lower river, among the bush-covered lowlands, the Marsh Hawk is a common and abundant species. A large number of specimens were brought to me by the natives at Hotham Inlet, all of which were young birds. It nests in the interior; but after the young are grown it is abundant along the Arctic coast. At this season of the year we see it flying back and forth over the wet meadow lands. The southern migration takes place during the latter part of September.

34. Astur atricapillus (*Wils.*) *Bp.* [433]. THE AMERICAN GOSHAWK.

This fine bird was observed only on one or two occasions in the Kowak River region. I have no data upon which to base an opinion, but according to my observation it is very uncommon. This species is one of the boldest and hardiest of the *Falconidæ*, and in lower latitudes many instances of its daring came under my observation.

TETRAONIDÆ. GROUSE.

35. Canace canadensis (*Linn.*) *Bp.* [472]. THE SPRUCE PARTRIDGE.

The Spruce Partridge is a sparing resident in this region. The only specimens that came under my notice were along the upper river. It is found exclusively in the spruce forests of the interior; and to my knowledge it never approaches the coast in this latitude. I have never seen the nest here, but it undoubtedly breeds wherever found.

36. Bonasa umbellus umbelloides (*Dougl.*) *Baird.* [473*a*]. THE GRAY RUFFED GROUSE.

Like its southern relative, the familiar partridge, this species is confined to the wooded interior. It is a sparing resident in the far north, and but comparatively few specimens came under my observation. Like the ruffed grouse of the lower latitudes the present species has the peculiar habit of "drumming." In the spruce forests I have frequently heard it drum for hours at a time. This is done during the mating season only, at which time many fierce rivalries exist between the males and pitched battles are often fought. I have seen deserted nests of this species containing fragments of the shell.

37. Lagopus albus (*Gm.*) *And.* [474]. THE WILLOW PTARMIGAN.

The White Ptarmigan, familiarly known as the Willow Grouse, is one of the most abundant species in northern Alaska. Throughout the open portions of the interior and along the shores of Hotham Inlet and Kotzebue Sound it is very common. During the nesting season comparatively few are seen; but when the young are fully fledged, about the middle of August, we find it everywhere.

The nest consists of a slight depression in the ground, lined with grass or lichens. The young are hatched the latter part of June. It subsists principally on berries, quantities of which are found, and also the leaves of the dwarf willow.

38. Lagopus rupestris (*Gm.*) *Leach* [475]. THE ROCK PTARMIGAN.

In the hilly or mountainous sections of the country the preceding is replaced by this handsome species. The Rock Ptarmigan is found in far less numbers, however; and I am inclined to think it is somewhat rare in the present region. On two occasions I obtained the female, together with the young. These are the only data I possess regarding them; and it would seem, according to this, that the Rock Ptarmigan is very uncommon. I hardly feel warranted in expressing a decided opinion in the matter.

CHARADRIIDÆ. PLOVERS.

39. Strepsilas interpres (*Linn.*) *Illig.* [509]. TURNSTONE.

40. Strepsilas melanocephala *Vig.* [510]. BLACK TURNSTONE.

One specimen of each of the Turnstones from Hotham Inlet or Kowak River in the collection.

41. Squatarola helvetica (*Linn.*) *Cuv.* [513]. THE BLACK-BELLIED PLOVER.

This handsome species is a common resident of the present region. It is one of the first arrivals in the spring. At this season it resorts to the hilly and well-drained sections, where it nests. When the young are fully fledged we find it in almost every section. The interior distribution is somewhat restricted, and we find it much more common on the coast. This bird is quite shy at all seasons; and when its haunts are invaded its warning whistle is heard on all hands. The plumage of the mature bird, richly variegated with black and gold, renders this species a very conspicuous object. The nest is generally placed on a knoll, and consists merely of a slight depression in the ground. Four large and finely marked eggs are the usual complement.

42. Charadrius dominicus *Müll*, [515]. THE AMERICAN GOLDEN PLOVER.

Like the preceding species, the Golden Plover is confined to the high and well-drained table lands. It is chiefly coastwise in distribution, although it nests to a limited extent in the interior. The unsuitable character of the country doubtless has its influence in this respect. In the fall it is very abundant along the shores of Hotham Inlet, where it assembles before leaving for the south.

43. Ægialitis semipalmatus *Bonap.* [516]. THE SEMI-PALMATED PLOVER.

The present species is the smallest representative of the *Charadriidæ* in northern Alaska. It has an inland distribution, although it is not an abundant species in any section. Along the river I found it principally on the exposed sand-bars or mud-flats. It never associates in flocks in this region. This species nests on the river banks, and when its haunts are invaded it manifests its alarm by incessant cries. In August it is more abundant and is found everywhere along the river. At this season I found it at Kotzebue Sound in small numbers. The Semi-palmated Plover is known in some sections as the Ringneck Plover, so called from the beautiful band encircling the neck.

SCOLOPACIDÆ. SNIPE.

44. Gallinago media wilsoni (*Temm.*) *Ridgw.* [526*a*]. WILSON'S SNIPE.

In the Kowak region this species is an uncommon resident. In the far interior not an individual came under my observation, but along the delta and lower portions of the river I found it in sparing numbers. It breeds in the wet marshes early in June, and in company with other

waders it resorts to the shores of Kotzebue Sound during early months of fall. The range of this species is very limited on the Arctic coast. It is much more abundant south of Bering Straits.

45. Macrorhamphus griseus scolopaceus (*Say*) *Coues* [527*a*]. THE RED-BELLIED SNIPE.

In this latitude the present species largely outnumbers the preceding and is an extremely abundant species. The inland distribution is somewhat restricted. In the mountain districts none came under my observation, but in the lower section it is one of the commonest waders. Here we find it wading about in every fresh-water pool, probing the mud with its long, slender bill.

It is not shy, and can be approached within a few yards without exciting alarm. Even after a deadly fire has been poured into their midst they often settle in the same spot, and by the use of a little skill a large number can be obtained.

Unlike the preceding species, it flies in large and compact flocks. It nests in the wet meadows early in June and leaves for the south about the middle of September.

46. Octodromas maculata (*Vieill.*) *Coues* [534]. THE PECTORAL SANDPIPER.

On the shores of Hotham Inlet, Kotzebue Sound, and the lower river this is a common resident. It does not associate in flocks, however, but small numbers can be found in every wet or grassy meadow. Its habits are much the same as those of the preceding, with which species it associates. It nests in this region in early June and departs for the south about the middle of September.

47. Pelidna alpina americana *Cass.* [539*a*]. THE RED-BACKED SANDPIPER.

One specimen from Hotham Inlet or Kowak River in the collection.

48. Ereunetes pusillus (*Linn.*) *Cass.* [541]. THE SEMIPALMATED SANDPIPER.

Throughout the river country this is a very abundant species. Along the sand-bars and muddy banks they are found in large numbers, and probably exceed all the other waders in this region. They nest along the banks of the river or on the borders of the neighboring marshes.

49. Calidris arenaria (*Linn.*) *Illig.* [542]. THE SANDERLING.

The only record of this species in the present region rests upon a small flock which I saw on the shore of Selawik Lake. On August 16, while in camp at that place, a flock of eight birds circled overhead and settled within a few yards of the spot where I was standing. Having no gun, and fearing that any motion might alarm them, I remained immovable. After carefully examining the birds and assuring myself of their identity I retreated towards the camp, but greatly to my disappointment they took flight. This is the only instance in which these birds were seen. Although the Sanderling has a northerly distribution they are very irregular in occurrence and may safely be called a rare species in this region.

50. Limosa lapponica novæ-zealandiæ *Gray* [544]. THE PACIFIC GODWIT.

From the delta of the river, along the shores of Hotham Inlet and Kotzebue Sound, this species is a common summer resident. They associate with the Red-bellied Snipe, although largely outnumbered by them. During the nesting season they resort principally to the rolling tundra sections. In the fall, however we find them on the wet meadow lands in company with the above-mentioned species.

51. Limosa hæmastica (*Linn.*) *Coues* [545]. THE HUDSONIAN GODWIT.

This fine bird is one of the most abundant waders in the Kowak region. Throughout the interior, wherever the country affords the proper feeding ground, they are a common resident. The Godwit nests in the tundra sections early in June, and about the latter part of August they concentrate in large numbers at Kotzebue Sound. They are not shy, and I have shot a great many at this season. They feed principally upon the ripening berries, of which there are large quantities.

52. Totanus flavipes (*Gmel.*) *Vieill.* [549]. THE YELLOW-LEGS.

Throughout the present region the Yellow-legs is a common but not an abundant species. On the coast it is a very rare bird; and during the two summers I have passed in these latitudes

I have never seen a coastwise specimen. They range along the entire length of the river. Above the delta a pair or more may be seen constantly as we ascend the river. They are extremely noisy; and when approached or disturbed manifest alarm with prolonged cries. Unlike the greater portion of the waders, they frequently perch upon trees and bushes. I found them in small flocks along the marshes and lagoons lying off the main river; and in securing two birds which I shot in one of these places I became helplessly mired.

In the lower latitudes this species is known as the "Tell-tale," a name well earned by its noisy, restless disposition. They nest throughout the present region; a dry spot in the marshes being usually selected for that purpose.

53. Rhyacophilus solitarius (*Wils.*) *Cass.* [550]. SOLITARY SANDPIPER.

One specimen from Hotham Inlet or Kowak River in the collection.

54. Unmenius hudsonicus *Lath.* [559]. THE HUDSONIAN CURLEW.

This fine species is a regular summer resident of the far north. Its interior distribution is rather less than that of the coast. We find them sparingly in the rolling sections along the river. After the nesting season, however, it resorts principally to the shores of Kotzebue Sound, and feeds upon the ripening berries. It is not an abundant species on any section of the Arctic coast. They are quite shy at all seasons; and great skill is required to obtain more than two or three birds in one locality. This Curlew is one of the largest waders found in the north.

55. Unmenius borealis (*Forst.*) *Lath.* [560]. THE ESKIMO CURLEW.

Although smaller than the preceding, the Eskimo Curlew largely outnumbers it. They resort to the same localities in which the Hudsonian is found, and the habits of both are almost identical. In the fall I found them in large numbers at the delta, as well as the wet meadows on either side of the river. At this season they are plump and well flavored, and afford most excellent sport. Both species leave for the south during the latter part of September.

PHALAROPODIDÆ. PHALAROPES.

56. Phalaropus fulicarius (*Linn.*) *Bp.* [563]. THE RED PHALAROPE.

This handsome bird has a very limited distribution in the Kowak region. During the nesting season it is found in the immediate vicinity of the river mouth; and in rare instances only do we find it above the delta. After the young are fledged this species is strictly maritime, and at this season we find them far out at sea, where they feed upon the animalculæ well known as the food of the bowhead whale.

The phalarope nests in the wet meadows along the sea-shore early in June, and does not leave until the water is closed by ice.

57. Lobipes hyperboreus (*Linn.*) *Cuv.* [564]. THE NORTHERN PHALAROPE.

The Northern Phalarope has a much wider distribution in the present region. In the vast marshes and lagoons of the delta it is a common species. Here we find them in every shallow pond and lakelet. I have frequently approached within a few feet of a flock without causing the slightest alarm. They nest here abundantly in June, and in the fall we find them in company with the preceding species. Both species are known to the whalers as "bowhead birds."

GRUIDÆ. CRANES.

58. Grus fraterculus *Cass.* [584]. THE LITTLE CRANE.

From the mouth of the Kowak throughout the interior the crane is an extremely abundant species. Along every exposed sand-bar in the river, as well as the adjacent marshes, a pair or more may be found. In the spring they are quite shy, and resort to localities of difficult approach. They nest principally in the deep marshes along the main river, and when the young are fully developed they are abundant in every portion of the interior. The natives insist that there is a larger species than the *fraterculus*, and this is in accordance with my own observation. I have examined with glasses large numbers of cranes, in places where approach was impracticable, the difference in size and coloration of which was noticeable even at a distance.

ANATIDÆ. DUCKS, GEESE.

59. Olor americanus (*Sharpless*) *Bp.* [588]. THE WHISTLING SWAN.

Although extremely rare on the coast, I found the swan moderately abundant at the delta of the river. It resorts almost exclusively to the marshes and lagoons of this region, and its occurrence on the Arctic coast may be regarded as exceptional. The swan also ranges for some distance up the river. I saw an occasional skin among the river natives throughout the region visited by us.

They associate in small numbers only. Not more than four or five birds are found in any locality. A native hunter brought in three fine specimens about the middle of August, and informed us that they were quite abundant. Before the southern navigation commences they are quite common here for a few days. The swan nests about the first of June, somewhat later than the geese, and leaves for the south early in September.

60. Anser albifrons gambeli (*Hartl.*) *Coues* [593]. THE AMERICAN WHITE-FRONTED GOOSE.

At the delta of the river, where the vast marshes extend as far as the eye can reach, we find this species in its greatest abundance. They reach this latitude early in May, or as soon as the lakes and marshes are free from ice, and nest here in the greatest numbers. The white-fronted species is commonly known as the Tundra Goose, from the frequency with which it occurs in those peculiar sections.

During the molting season, the latter part of July, they are quite helpless, and large numbers are speared by the natives.

They leave for the south in September, when ice begins to form on the marshes.

61. Bernicla canadensis hutchinsi (*Sw. & Rich.*) *Ridgw.* [594*a*]. HUTCHINS'S.

This form has a limited range only in the present region. The main body is confined to the Bering Sea coast of Alaska, several hundred miles south. Among twenty specimens not more than one can be referred to this species.

62. Bernicla canadensis leucopacia (*Brandt*) *Cass.* [594*b*]. THE WHITE-CHEEKED GOOSE.

The range of this species in this region is almost identical with that of the White-fronted Goose. Its interior distribution exceeds it, however, and it is more common. The habits, time of arrival, and departure do not differ essentially from those of the other species.

63. Bernicla nigricans (*Lawr.*) *Cass.* [569]. THE BLACK BRANT.

These birds occur here merely as spring and fall migrants. The main flight, which passes over very early in the spring, breed in the far north, possibly on the unknown lands surrounding the pole. In the present region we only find occasional specimens, which are merely stragglers from the main body. They may safely be called a very rare resident of this region.

64. Dafila acuta (*Linn.*) *Bonap.* [605]. THE PINTAIL.

The Pintail, or, as it is sometimes called, the Sprigtail, is the most abundant duck in northern Alaska, and they outnumber all other species combined in the present section. It has an interior as well as a coastwise distribution, although it is somewhat restricted in the former region. For a distance of one hundred miles above the mouth the Pintail is very common, but above that point we seldom see them. They nest in large numbers at the delta, and in the fall they are very abundant on the shores of Kotzebue Sound.

They are not shy, and I have often approached within a few rods without alarming them. They are among the first arrivals in the spring and the last to leave in the fall.

65. Mareca americana (*Gmel.*) *Steph.* [607]. THE BALDPATE.

The distribution of the American Widgeon north of the circle is very limited. On the Kowak River they were noted on a few occasions only, and I am inclined to think them somewhat rare. Along the shores of Hotham Inlet they are a sparing summer resident, and a few specimens were obtained during our stay at that place. They nest, where found, in northern Alaska.

66. Nettion carolinensis (*Gmel.*) *Baird* [612]. THE GREEN-WINGED TEAL.

This well known and handsome species has an extended range in northern Alaska. It nests in moderately large numbers at the delta, and ranges for a hundred miles or more above that point. In the fall they are one of the commonest ducks at Hotham Inlet, and nearly equal to the Pintail in abundance. They generally associate in flocks of a dozen or more and are very unsuspicious. I have frequently obtained almost the entire flock by remaining concealed in the grass. The Green-wing leaves early in September.

67. Fulix marila (*Linn.*) *Baird* [614]. THE SCAUP DUCK.

Like the Widgeon, the distribution of this species is somewhat restricted in the present region. According to my observation, they are not abundant north of the Bering Strait; and above Kotzebue Sound they are seldom seen. It is confined exclusively to the small lakes and fresh-water ponds lying inland, where they breed to a limited extent. I saw a few at the delta, but none on the main river. In the southern portion of its range the Scaup Duck is much more common.

68. Harelda glacialis (*Linn.*) *Leach* [623]. THE OLD SQUAW DUCK.

The present species is one of the most peculiar and widely distributed of the northern waterfowl. It is equally at home in the great ice-fields of the Arctic or the vast marshes and lagoons of the interior. They arrive in this latitude very early in the spring, before the ice has commenced to break up; and at this season they resort to the few open spots that can be found. During the nesting season, which begins as soon as the snow leaves, they resort in large numbers to the marshes and flat sections, where they remain until the young are fledged. From this time they are chiefly maritime in distribution, and we seldom find them except along the sea-shore. Here they remain until the ocean closes with ice.

69. Œdemia americana *Sw. & Rich.* [630]. THE AMERICAN SCOTER.

Although properly a sea duck, the Scoter has a limited inland distribution. In the present region we find them during the breeding season extending as far as the head of the delta. They are not abundant, however, and may be regarded as an uncommon species. After the conclusion of the nesting season they resort to the coast exclusively, and I have never seen a specimen in the above-mentioned region.

70. Melanetta velvetina (*Cass.*) *Baird* [632]. THE AMERICAN VELVET SCOTER.

The distribution of this handsome species seems to be very irregular in the present region. The only record I have in the present region rests upon a single flock. On July 26, while in camp on the river, at a point about two hundred miles above the mouth, a large flock of Velvet Scoters were seen drifting by on the strong current of the river. Although I made every effort to get within range it was impossible to do so, and I was greatly disappointed to see them take flight. The occurrence of these birds here was rather unexpected. According to previous observations they are strictly maritime in this latitude. This species breeds to a limited extent at the delta. In the fall more were observed here, and but few were seen at Hotham Inlet.

71. Mergus merganser americanus (*Cass.*) *Ridgw.* [636]. THE AMERICAN SHELDRAKE.

On the coast region of Alaska the Sheldrake is a very rare species. In the present region, however, the Sheldrake is a common, although not an abundant, species. At the various points along the river I saw and obtained specimens of it. I have never seen more than a pair in one locality, and in several instances only saw the female. In the early part of August I obtained the latter, together with the young, which at that time were in downy plumage. I infer from this that they arrive late in the spring.

72. Mergus serrator (*Linn.*) [637]. THE RED-BREASTED SHELDRAKE.

The present species is found in varying abundance in the Kowak region. They are confined chiefly to the lagoons and lakes lying off the main river, among which they breed. We find them also common on the shores of Hotham Inlet and Kotzebue Sound.

LARIDÆ. GULLS, TERNS.

73. Pagophila eburnea (*Phipps*) *Kaup* [657]. IVORY GULL.

One specimen from Hotham Inlet or Kowak River in the collection transmitted to the Smithsonian Institution.

74. Rissa tridactyla kotzebui (*Bp.*) *Coues* [658*a*]. THE PACIFIC KITTIWAKE.

This interesting and widely distributed gull has a limited range only in the present region. It is chiefly coastwise in distribution, and along the interior waters its occurrence may be regarded as accidental. I have seen them at the delta of the river, but it is very doubtful whether they nest there. The Kittiwake breeds in great numbers on the rocky shores of Chammiso Island, which is only a few miles distant.

75. Larus glaucus *Brünn* [660]. THE GLAUCOUS GULL.

The Glaucous Gull largely outnumbers all other species in the present region. Its habits are a strange combination of the fresh-water and salt-water gulls, and we find them commonly in both places. In the Kowak region the inland distribution of the Glaucous Gull greatly exceeds that of the coast, and throughout the interior they are extremely abundant. The distribution of this species is in a measure complementary to that of the Arctic Tern, and in localities resorted to by the latter the gull is unaccountably absent. They nest in large numbers at the delta and throughout the interior.

76. Larus glaucescens *Licht.* [662]. THE GLAUCOUS-WINGED GULL.

This gull has a very limited range in the Kowak region. It is confined to the immediate vicinity of the river mouth, and is never seen above the delta. On the shore of Kotzebue Sound it is moderately abundant, and replaces the preceding species to a certain extent. They are much more abundant south of the Bering Strait.

77. Larus philadelphiæ (*Ord.*) *Gray* [675]. BONAPARTE'S GULL.

On the Arctic coast this species is of very rare occurrence. There is no record of it north of the Bering Strait, and according to my observation it is strictly an inland species. In the present region it is a regular summer resident, and occurs throughout the interior. It is not abundant, neither is it rare.

They undoubtedly nest in this region.

78. Sterna macrura (*Naum.*) [687]. THE ARCTIC TERN.

For a distance of one hundred miles above the delta the Arctic Tern is extremely abundant. Although it is the smallest of the *Laridæ*, it is one of the most interesting as well. It is known in every portion of the far north, and resorts commonly to the inland waters, as well as the icy seas. The tern arrives early in May or as soon as the ice moves out of the rivers. The nest is generally placed upon a sand-spit or any bare location along the river, and the young are hatched in June.

During the nesting season the male birds may be seen circling about in the vicinity, and the peculiarly reckless and headlong manner in which they plunge into the water will at once draw attention.

They are extremely belligerent in their disposition, and will attack and drive away any species that may invade their domain. Even the presence of man is warmly resented, and I have often been attacked while invading its haunt. A single discharge from a shot-gun will cause them to be remarkably scarce, however. On the wing these birds are very graceful. Their long, pointed wings and deeply forked tails, together with the elegance of coloring, renders them one of the most beautiful species.

79. Stercorarius parasiticus (*Linn.*) *Saunders* [699]. THE LONG-TAILED JAEGER.

This elegant species has a limited range in the Kowak region. We usually find them in pairs, and they are not abundant in any locality. In several instances I saw them in company with the Glaucous Gull, upon whom they practice their piratical operations. The jaegers habitually attack and annoy the gulls and compel them to disgorge their prey, and in consequence of this fact it is a bird of ill repute among the gulls.

They nest here in the marshes wherever found.

JULIUS BIEN & CO. LITH.

PARROT AUK

COLYMBIDÆ. LOONS.

80. Colymbus torquatus *Brünn* [736]. THE LOON.

This species is the most uncommon diver in northern Alaska. It was noted on a few occasions, however, but I am inclined to think it rare. It is largely outnumbered by the black-throated species. I saw an occasional skin among the natives and learned from them that it occurs at rare intervals only. The Loon is much more common on the Bering Sea coast.

81. Colymbus adamsi *Gray* [737]. THE GREAT WHITE-BILLED LOON.

The above-mentioned species is the largest representative of the *Colymbidæ*, and is a well-known resident of this region. It is not abundant in any section, however, but is more common than the preceding. They nest in the great marshes of the delta, but do not range above the head. I saw several skins among the natives, which were usefully employed as "ditty bags."

82. Colymbus arcticus *Linn.* [738]. THE BLACK-THROATED DIVER.

Throughout the interior, along the shores of Hotham Inlet and Kotzebue Sound, the black-throated species is extremely abundant. Here it is found more common than in any other section of the north. In this latitude it associates in large flocks, and we see them in every marsh and lagoon along the river.

During the hours of the night the wild cry of the loon alone breaks the stillness, and always imparts to one a sense of indescribable loneliness.

This loon nests in the impenetrable marshes of this region during the latter part of May, and leaves when its haunts are closed with ice.

83. Colymbus septentrionalis *Linn.* [740]. THE RED-THROATED DIVER.

The haunts and habits of this bird are almost identical with those of the preceding species. It is much more uncommon, however, and not more than one in ten specimens can be referred to this species.

NOTES ON THE DOWNY YOUNG OF THE PARROT AUK AND OF THE CRESTED AUK.

By LEONARD STEJNEGER.

(Two plates.)

During the cruise of the *Corwin*, 1884, several downy young were collected by Mr. J. E. Lutz on Otter Island. They are of special interest, since the newly hatched chicks of the two species collected have never been received at any museum, so far as known, nor have they ever before been described or figured.

Cyclorrhynchus psittaculus (*Pall.*) *Ridgw.* [747]. THE PARROT AUK. (Plate I.)

Baird, Brewer, and Ridgway, Water Birds of North America, 1, p. 515.

Downy young (U. S. Nat. Mus., No. 100378: J. E. Lutz, coll., No. 27, Otter Island, July 17, 1884.)

The bill exhibits all the curious peculiarities which characterize the genus *Cyclorrhynchus*, the "recurved" commissure, the falcate shape of the lower mandible, and the sidewise compression of the whole beak. In fact, the bill is very similar to that of the adult bird, of which Mr. Cassin said that "it seems to attain a maximum of oddity amongst the queer bills of this family of birds, the whole affair looking as if it might be a nose of wax badly pinched upwards, especially to the disadvantage of the under mandible." The chief difference is that in the chick the upper mandible is bent more abruptly towards the point, which, on account of the knob for breaking the egg shell still remaining, presents a truncate profile. The characteristic notch behind the tip is present. The nostrils are pervious. The color of the bill is a horny brownish gray, more dusky towards the tip; corner of mouth in the fresh bird probably whitish.

The color of the downy plumage above is of a dark smoky gray; darker, nearly blackish on the head and sides of neck; chin, throat, and fore neck of the same general color, scarcely paler; rest of the under surface light ashy gray, with very slight if any fuliginous tinge, in strong contrast to the dark line of the upper parts and the neck, the darker line being very sharply defined.

The collector's label indicates the color of the feet as "bluish, very light between the toes, under side black."

The iris, according to the label of No. 100380, is "dark gray."

Two other specimens agree very closely with the one described above, except that in No. 100379 the sides of the neck are considerably darker in the middle. The bills are scarcely shorter, but the tip even more abruptly truncate.

Dimensions (inches and decimals).

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Collector's measurements from fresh specimens.			Dimensions from skin.	
				Length.	Girth.	Wings, tip to tip.	Exp. culmen.	Tarsus.
100378	27	Otter Island ...	July 17, 1884	4.80	3.13	4.44	0.36	0.62
100379	28	....do	July 18, 1884	4.94	3.25	4.43	0.35	0.55
100380	29	....do	....do	5.50	4.00	5.31	0.35	0.63

Simorhynchus cristatellus (*Pall.*) *Merr.* [748]. THE CRESTED AUK. (Plate 1.)

Baird, Brewer, and Ridgway, Water Birds of North America, 1, p. 512.

Downy young (U. S. Nat. Mus., No. 100374; J. E. Lutz, coll., No. 33, Otter Island, July 22, 1884.)

The bill agrees in general shape with that of the adults in winter before the curious nuptial outgrowths have changed it so radically and is scarcely distinguishable from that of *Simorhynchus pygmæus* of the corresponding age. Color, dark horny brown, lighter on terminal half of lower mandible.

The color of the downy plumage is a uniform dark, smoky, and somewhat brownish gray, scarcely lighter on the under parts.

According to the collector's label, "the legs and feet are slate color in front, black underneath."

Iris, according to the same authority, "gray."

Two other specimens, No. 100375 and No. 100377, are on the whole similar to that just described, but the under parts are slightly lighter and grayer, especially No. 100377, which, according to the note on the label, was "taken from the egg," and has the bill whitish, with dusky tip and base.

The fourth specimen is still lighter underneath, especially on the belly, which is nearly ash color, and has besides a small white spot on the chin. It has evidently just left the egg, and its size prohibits its being referred to any other species. The differences mentioned may, therefore, be regarded as due to individual variation.

Dimensions (inches and decimals).

U. S. Nat. Mus. No.	Collector's No.	Locality.	When collected.	Collector's measurements from fresh specimens.			Dimensions from skin.	
				Length.	Girth.	Wings, tip to tip.	Exp. culmen.	Tarsus.
100374	33	Otter Island	July 22, 1884	5.62	3.56	6.43	0.34	0.75
100375	31	...do	July 20, 1884	5.25	3.43	5.62	0.30	0.67
100376	30	.. do	July 17, 1884	5.31	3.62	4.88	0.31	0.63
100377	32	....do	July 20, 1884	4.44	2.94	4.06	0.30	0.56

SMITHSONIAN INSTITUTION, *Washington, D. C., February* 22, 1884.

STATEMENT REGARDING THE NATURAL HISTORY SPECIMENS COLLECTED BY THE CORWIN.

The following statement, furnished by Mr. F. W. True, acting curator-in-charge, Smithsonian Institution, is all that this office has to represent numbers 6, 7, 8, 9, and 10, mentioned in letter of the Secretary of the Treasury, dated February 28, 1885, addressed to the Speaker of the House of Representatives.

These collections, which consisted chiefly of marine invertebrates, birds, shells, fishes, plants, and rocks, were presented to the U. S. National Museum. Identification of a portion of the specimens has been made by the curators of that institution, and the common and scientific names are given in the following list:

BIRDS.

The following species of birds were obtained:

Crested Auklet, *Simorhynchus cristatellus* (Pall.).
Parroquet Auklet, *Cyclorrhynchus psittaculus* (Pall.).
Long-billed Dowitcher, *Macrorhamphus scolopaceus* (Say).
Pacific Godwit, *Limosa baueri* (Naum.).
Hudsonian Godwit, *Limosa hæmastica* (Linn.).
Yellow-legs, *Totanus flavipes* (Gmel.).
Solitary Sandpiper, *Totanus solitarius* (Wils.).
Semi-palmated Sandpiper, *Ereunetes pusillus* (Linn.).
Red-backed Sandpiper, *Tringa alpina pacifica* (Coues).
Pectoral Sandpiper, *Tringa maculata* Vieill.
Red Phalarope, *Phalaropus fulicarius* (Linn.).
Hudsonian Curlew, *Numenius hudsonicus* Lath.
Eskimo Curlew, *Numenius borealis* (Forst.).
Pacific Golden Plover, *Charadrius dominicus fulvus* (Gmel.).
Semi-palmated Plover, *Ægialitis semipalmata* Bonap.
Turnstone, *Arenaria interores* (Linn.).
Black Turnstone, *Arenaria melanocephala* (Vig.).
Little Brown Crane, *Grus canadensis* (Linn.).
Black-throated Loon, *Urinator arcticus* (Linn.).
Ivory Gull, *Gavia alba* (Gunn.).
Bonaparte's Gull, *Larus philadelphia* (Ord.).
Glaucous-winged Gull, *Larus glaucescens* (?) Naum.
Arctic Tern, *Sterna paradisæa* Brunn.
Old-squaw, *Clangula hyemalis* (Linn.).
Green-winged Teal, *Nettion carolienssis* (Gmel.).
American Goshawk, *Astur atricapillus* (Wils.).
Pigeon Hawk, *Falco columbarius* Linn.
American Magpie, *Pica rustica hudsonica* (Sab.).
Northern Shrike, *Lanius borealis* Vieill.
Barn Swallow, *Chilidon erythrogaster* (Bodd.).
Gray-cheeked Thrush, *Turdus alicia* Baird.
Snowy Owl, *Nyctea nyctea* (Linn.).

FISHES.

California Flounder, *Pleuronectes stellatus* Pallas.
Blenny, *Delolepis virgatus*.
Four-spined Sculpin, *Cottus quadricornis* L.
Pike, *Esox lucius* L.
Grayling, *Thymallus signifer* Rich.
Whitefish, *Coregonus pusillus*.
California Herring, *Clupea mirabilis* Gir.

MOLLUSKS.

Mr. Dall makes the following statement in regard to the shells: The shells collected by the *Corwin* and sent by Captain Healy have been carefully preserved with the idea of working them up for a general report of the shells of Bering Strait and Sea at some future time. They have